THE IRON TRADE REVIEW

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STEEL WHEELS

TO BE SUBSTITUTED FOR IRON ON CHICAGO STREET LINES.

Cars Ordered by Several Railways and Inquiries Pending—Sales of Basic and Foundry Pig Iron.

The expectation of tariff revision and uncertainty as to the attitude of many state legislatures concerning the railroads and other corporations, are having a depressing effect on the iron market. The expression of fear of tariff reduction may sometimes be a pretext rather than a real reason, but the effect is nevertheless felt. The demand for lower prices on finished products is frequently based on the anticipation of lower tariff rates, and the ability of consumers to estimate how reductions should be made is in some cases surprising.

Pig Iron Conditions

Activity in pig iron has been confined almost entirely to cast iron pipe interests. A sale of 20,000 tons of southern iron has been made to the leading pipe interest, and sales pending or closed in the Buffalo district amount to 10,000 tons. Sales of 20,000 tons of basic have been made at Pittsburg. Reports of weakness in the southern market are apparently due to a few transactions in resale iron, and southern furnace interests are holding firmly to the $13 price, although generally willing to make that quotation for second quarter.

Railroad Buying

A contract which will ultimately involve the substitution of many thousand street car steel wheels for cast iron wheels, has been made by the Chicago City Railway Co. with the Carnegie Steel Co. The New York Central has ordered 2,000 steel hopper freight cars, of which 1,000 will be built by the Standard Steel Car Co., and 1,000 by the American Car & Foundry Co. The steel will be furnished by the Carnegie and the Jones & Laughlin Steel companies. The same system has ordered 1,000 box cars with steel underframes to be built in the company's own shops with Bettendorf Axle Co. underframes. The Pennsylvania system contemplates the purchase of at least 5,000 steel cars, including the inquiry for 2,600 recently sent out. The receivers of the Seaboard Air Line have ordered 700 steel underframe box cars, 15 passenger cars and 50 ballast cars. The Great Northern has purchased 8,000 tons of steel rails and is in the market for 18,000 tons. The Philadelphia Rapid Transit Co. has authorized the purchase of 10,000 tons of rails. Sales of spikes and bolts in the Chicago district amount to 30,000 tons.

Structural Material

No very large contracts for structural material are reported, but a considerable number of contracts of moderate size have been awarded, including the following: The Cohen loft building, New York City, to A. E. Norton & Co., 1,485 tons; the Central City Refrigerating Co., Syracuse, N. Y., to the Jones & Laughlin Steel Co., 1,200 tons; the Crane warehouse, San Francisco, to Milliken Bros., 600 tons; two schools in Philadelphia, to the McClintic-Marshall Construction Co., 800 tons; the Jeffrey Mfg. Co., new building at Columbus, O., to the Interstate Engineering Co., 1,500 tons; James B. Clow & Sons new plant at Coshocton, O., to the National Iron & Wire Co., 500 tons.

Coke and Old Material

There is continued weakness in the coke market for prompt shipment, owing to the fact that the production is considerably greater than the present demand. It is expected that the number of ovens in operation will be much reduced unless the demand improves shortly. The mills have won in their contest with dealers in old material in the Philadelphia district, where prices are lower, and there is also weakness in Cleveland, Chicago and other centers.

IMPORTANT STEEL WHEEL CONTRACT.

(Special Telegram.)

Pittsburg, Jan. 20.—The Carnegie Steel Co. has closed a contract with the Chicago City Railway Co. to furnish all the wheel requirements of that system. This contract contemplates the gradual substitution of Schoen steel wheels for all wheels now in use on the line, including cast iron wheels. It is one of the largest contracts of the kind ever placed by an electric traction company.

A steel car interest of this territory, which has been buying special analysis basic iron for first half delivery, has contracted for a total of about 20,000 tons in several different lots.

Special meetings of steel makers, including sheet manufacturers, were held the past week, and prices were re-affirmed.

DEATH OF WILLIAM G. PARK.

(Special Telegram.)

Pittsburg, Jan. 20.—William G. Park, chairman of the Crucible Steel Co. of America, died suddenly of neuralgia of the heart at Pittsburg, Jan. 19, aged 59. Mr. Park was one of the most prominent figures in tool steel manufacture in the country. Mr. Park's death is the second among the officials of the company in several weeks, that of Alexander Thomas, secretary, occuring at Hamburg, Germany, Jan. 8.

LARGE SALE OF PIG IRON TO PIPE INTEREST.

(Special Telegram.)

Birmingham, Ala., Jan. 19.—The Sloss-Sheffield Steel & Iron Co. has sold 20,000 tons of pig iron to the leading pipe company, delivery throughout the first half on the basis of $13 for No. 2 foundry.

It is rumored here that the Alabama Consolidated Coal & Iron Co. is negotiating for the purchase of the Dimmick Pipe Co. and that the deal is almost closed.

THE WEEK IN IRON CENTERS

PITTSBURG.

Satisfactory Specifications, Very Little New Business.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., Jan. 19.

The slow movement of the iron and steel market continues. With some interests, the past week has been the best of the new year and specifications have reached the level prevailing before the holiday interruptions, so that the month of January bids fair to show no loss of ground. The forward impetus given by active buying, however, is still lacking.

Many makers are not inclined to look with discouragement upon the present absence of consistent improvement in the market. It is declared that the opening weeks of the new year are not necessarily favorable for the receipt of heavy mill orders, as inventories having just been taken there is an expected deliberation among buyers in specifying until the trade probabilities of the new period have been surveyed and policies adjusted in accordance. A source of satisfaction, it is pointed out, lies in the fact that any advance the market has made during the latter part of the past year is now being well sustained.

There is considerable shading of prices in different materials, but this is not regarded as significant of particular weakness, as concessions are not absent, among some makers, even in more prosperous times. The coke market has shown the most marked softness of late, but this has applied largely to spot material and is attributable to an overproduction resulting from the non-fulfillment of the anticipation that a greater consuming capacity would be in operation immediately after the first of the year. There is more or less price cutting in plates and sheets. The pig iron market, despite the light volume of trading, is holding well around the level fixed by the more active buying during the past several months.

Pig Iron.—The quiet market in pig iron continues. While prices have settled somewhat, in that those interests which have been holding for maximum prices have lowered their quotations, the minimum level is being well sustained and the general market is reasonably firm. The inquiry is light.

A car wheel interest in this territory which has been buying considerable low phosphorus, high manganese basic, has closed for an additional lot of about 7,000 tons for first half around $16 valley. This transaction is exclusive of another of 5,000 tons recently reported. The Bessemer market now ranges from $16.50 to $16.75 valley, as several interests which have been quoting $17, have receded to the lower maximum. There is an inquiry in the market for 2,000 tons of Bessemer for a Philadelphia consumer. The malleable market runs from $15.75 to $16 valley.

The general range of foundry sales is around $15.50 valley for No. 2, although higher prices are not infrequent where certain makes are desired and the analysis is especially favorable. A northern Ohio melter took 600 tons of No. 3 iron for first quarter under $15.50 valley. A machine company in this district is in the market for a fair-sized tonnage. The rebuilt Scottdale furnace of Corrigan-McKinney & Co. at Scottdale, Pa., was blown in on foundry and forge, Jan. 18.

While the general southern market remains $13 Birmingham on No. 2, the makers are not so strong in their ideas of higher prices for second quarter delivery. A sale of No. 2 at $12.75 Birmingham in Cincinnati territory is reported, but it is stated that this was resale iron.

On prompt and first quarter delivery on northern iron, we quote as follows:

Bessemer, valley	$16.50 to 16.75
Bessemer, Pittsburg	17.40 to 17.65
No. 1 foundry, Pittsburg	16.65 to 16.90
No. 2 foundry, Pittsburg	16.40 to 16.65
Gray forge, Pittsburg	**15.40 to 15.90**
Basic, valley	15.75 to 16.00
Basic, Pittsburg	16.65 to 16.90

Ferro-Alloys.—There is little activity in the market, and in some grades lower prices are being named, particularly in 50 per cent ferro-silicon. We quote 80 per cent ferro-manganese at $44 to $45 seaboard, with a freight rate of $1.95 to Pittsburg.

Imported 50 per cent ferro-silicon is quoted at $62.50 to $63 Pittsburg on forward deliveries; domestic 12 per cent, $27.50; 11 per cent, $26.50; 10 per cent, $25.50 Pittsburg.

Plates.—The New York Central lines have placed orders for 2,000 50-ton steel hopper freight cars, of which 1,000 for the New York Central & Hudson River railroad will be furnished by the Standard Steel Car Co., and 1,000 for the Lake Shore & Michigan Southern railroad by the American Car & Foundry Co. This order is an addition to the one for 500 cars recently awarded the Standard Steel Car Co. by the Pittsburg & Lake Erie railroad. The Carnegie Steel Co. has taken the contract to furnish 10,000 tons of plates for one of these lots of 1,000 cars, and the Jones & Laughlin Steel Co. will supply the material for the other. Upon the statement of President McRae, the Pennsylvania system is contemplating the purchase of at least 5,000 steel cars, and the inquiries for 2,600 of these for the lines west are already out, as previously stated. The Carnegie Steel Co. has taken the order from the American Shipbuilding Co. for the material for a small lake freighter, which will require about 800 tons of plates and shapes. There is a fair amount of specifying for plates from the steel car companies, boat builders and miscellaneous sources. Shading of prices, particularly on the narrow gages, is current. We quote officially as follows:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The unfavorable general weather conditions are having an effect on building operations, and sheet orders are not so liberal. Of the several classes of manufacturing consumers of sheets, electrical companies are operating most actively, especially the smaller sized companies. This trade is directing good specifications to the sheet mills. An inquiry for 500 tons of corrugated iron sheets for export is in the market. The independent sheet makers are resuming in full after holiday and inventory shut-downs, the plants of Whitaker-Glessner seven mills, Youngstown Iron & Steel Roofing six mills and Follansbee Bros. Co., two mills, having resumed recently. The American Sheet & Tin Plate Co. this week is operating 101 mills or 54 per cent compared with 113

mills or 64 per cent last week. The mills taken off this week include eight Vandergrift, four Aetna-Standard, four Piqua and three New Philadelphia. Shading of sheet prices continues. We quote officially as follows:

Blue annealed sheets, No. 10 and heavier, 1.80c; Nos. 11 and 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 2c; box annealed, Nos. 17 to 21, 2.25c; Nos. 22 to 24, 2.30c; Nos. 25 and 26, 2.35c; No. 27, 2.40c; No. 28, 2.40c; No. 29, 2.60c; No. 30, 2.70c; galvanized sheets, Nos. 10 and 11, 2.45c; Nos. 12 and 14, 2.55c; Nos. 15 and 16, 2.65c; Nos. 17 to 21, 2.80c; Nos. 22 and 24, 2.95c; Nos. 25 and 26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.70c; No. 30, 2.95c; corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation, and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28.

Jobbers are allowed $1 a ton from these prices.

Tin Plate.—The enameled ware manufacturers are enjoying an active demand for their products, and are regularly consuming a favorable amount of tin mill material. The fish packers of the Pacific coast continue to specify freely against their contracts. The independent tin mills are practically all under way again. The leading interest this week has going 160 mills, or 66 per cent of capacity, which is the same record as last week. We quote official prices as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—The specifications for that portion of the Pennsylvania contract which is to be shipped during the month of January, together with more liberal orders against other standard rail contracts and an increased demand for light rails, have resulted in a greater activity at present at the Edgar Thomson works of the Carnegie Steel Co., than for a number of months. While the mills are still gaited, a greater tonnage of rails is now being rolled. The No. 1 mill, the large standard mill, is operating more steadily. No definite developments on pending contracts are reported, but it is stated that the outlook is favorable. There is a good demand for light rails and the bookings of Carnegie Steel Co. the past week reached 2,600 tons, which is a high mark under present conditions. The re-rollers continue to undersell official prices on billet rails. On present specifications on Bessemer rails, we quote as follows, the base price for open-hearth rails being $30 mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $32; 12-pound, $29; 16-pound, $27; 20-pound, $26; 25 to 45-pound, $25; angle splice bars for standard sections, $1.65; standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.80 to $1.90 Pittsburg.

Steel.—Sheet bars are moving in better volume and the consuming demand for billets against standing contracts are also greater. Offering of new business in either sheet bars or billets is light, as the leading consumers are all under contract.

Bessemer and open-hearth billets, base sizes, are quoted at $25 Pittsburg, and forging billets at $27 Pittsburg, subject to the division of the freight charge over $1 and not exceeding $2, and sheet and tin bars at $27.50 Pittsburg, valley and Wheeling territory, and $27 Pittsburg for delivery to other points.

Hoops and Bands.—Consumers of hops are ordering in a hand to mouth style against unspecified contracts which have been extended into the new year. There is practically a total absence of contracting. Some shading of prices is reported. We quote official prices:

Hoops in carload lots, 1.80c; in less than carload lots, 1.90c; bands, 1.40c, base half extras as per standard steel.

Merchant Bars.—Mill orders for steel bars are showing practically no increase, and are continuing at the same rate as during the past several months. The steel bar mills are working at from 50 to 55 per cent of capacity. The bar iron market has a better tone, but new business is still restricted. We quote officially as follows:

Common iron bars, 1.50c Pittsburg in carload lots and over; 1.55c in less than carloads, 1.32c to 1.35c base Pittsburg, plus freight to point of shipment on western deliveries; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3-inch 1.50c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 57 per cent in carloads, and 52 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.60c base. Iron finished tire under 1½ by ½ inches, 1.55c, plus ½ extra on tire card; iron finished tire, 1½ by ½ and over, 1.40c, plus ½ extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices for 100 pounds, $3.35 on hard, and $3.60 on soft.

Structural Material.—Little improvement is to be noted in the structural situation. While there is much estimating work under way, caution in going ahead on new work is still being shown by prospective investors. The larger structural mills are getting a fairly good run of specifications against contracts. The sharp competition is still productive of close figuring by fabricators. The award for the new building of the T. C. Jenkins estate in this city, for which bids have been taken, has not been announced. Wm. Miller & Sons, Pittsburg, have taken the contract for the erection of a theater building on the North Side, Pittsburg, which will require about 250 tons. We quote official prices as follows:

Beams and channels, 15-inch and under, 1.60c; over 15 inches, 1.70c; zees, 1.60c; tees, 1.65c; angles from 3 to 6 inches, 1.60c; over 6 inches, 1.70c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Merchant Pipe.—The feature of pipe conditions is a sustained demand for merchant pipe. The jobbers, though carrying practically no stocks, are ordering steadily, and this material is moving directly to consumers. Competition among jobbers is spirited, and cutting of store prices is being done. In oil and gas field goods there is a great amount of work under advisement pending the financing of projects, much of which is expected to be placed during the year. The most advanced large project now before the market is for 80 miles of 16-inch for the Ohio Fuel Supply Co. The National Tube Co., Spang, Chalfant & Co., Inc., and other large makers in this territory have active about 50 per cent of their pipe furnaces. We quote the following official base discounts subject to five off to jobbers, while a few of the very largest jobbers with mill connections are given an additional one point off:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
¼ to 6 inches....	75	65	73	63

Boiler Tubes.—The boiler tube situation continues quite unsatisfactory, and prospects for improvement are not very definite. There is some shading of prices, particularly among iron tube makers. We quote the following of-

ficial discounts to the general trade on base sizes:

BOILER TUBES.

	Iron.	Steel.
2¼ to 5 inches.....	52	65

Wire Products.—The jobbing trade in nails and wire in this territory has covered for its requirements over the first 60 days of the year. This is an example of greater confidence being shown and is regarded with encouragement by manufacturers. The season is normally quiet, specifications are not heavy, and the interest of manufacturers is centered upon the spring trade for which the outlook is comparatively promising. We quote official prices as follows:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c.

Wire Rods.—Little new business in wire rods is current. Prices are unchanged, and we quote $33 Pittsburg on Bessemer and $34 Pittsburg on open-hearth rods.

Coke.—While the general conditions of the coke market, particularly with respect to the weakness in furnace coke, have not perceptibly improved, efforts toward a gradual strengthening of the market continue to be made by many operators. The offerings of furnace coke at concessions are somewhat less general, although prices have not undergone much change. We note a sale of 100 cars of high grade furnace coke for immediate shipment at $1.70 ovens. Contracts for several months ahead have been closed at $1.75 ovens. We quote the spot market on high grade furnace coke at from $1.65 to $1.70 ovens, although lower than this minimum has been done on bargain lots. The contract market on high grade furnace coke is from $1.90 to $2 ovens. Some makers of foundry coke are receiving numerous hurry-up orders from their general trade outside of the Pittsburg territory, and are making full capacity shipments from their plants. The harvester interests are steadily taking tonnage. We quote the spot market on first class Connellsville foundry coke at from $2.10 to $2.25 ovens, and on contract from $2.25 to $2.50 ovens. The *Connellsville Courier* for the week ending Jan. 9 shows a total output of 265,158 tons from 23,653 active ovens, compared with a production of 252,058 tons and a going capacity of 22,556 ovens the preceding week.

Old Material.—The old material market has an easier tone. Heavy steel is coming from dealers' hands more readily and carload and small lot sales were made the past week at $16 this district. Buying of this material is light. The embargo on turnings and borings against the plant of the Allegheny Steel Co. which was recently lifted, has been replaced and the market on these grades has been further depressed as a result. There has been considerable contracting by the dealers with the mills for the latters' first half output of sheet scrap at prices ranging from $14.50 to $15 mill. We quote delivered in the Pittsburg district as follows:

Heavy melting scrap, $16 to $16.50; re-rolling rails, $17.25 to $17.75; bundled sheet scrap, $14.25 to $14.75; iron axles, $23.50 to $24; old iron rails, $18.50 to $19; No. 1 wrought scrap, $17.50 to $18; old car wheels, $16.75 to $17.25; low phosphorus, $18.50 to $19; machine shop turnings, $12.25 to $12.75; cast borings, $10 to $10.50; No. 1 cast scrap, $14.75 to $15.25; malleable, $15 to $15.50.

CHICAGO.

Very Little Activity in Pig Iron—Scrap Market Weak.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Jan. 19.

Market conditions of the past week offer little upon which to base judgment of what progress is being made. If it were not for the well ordered condition into which most business enterprises have been brought during 1907, the long delayed resumption of activity might have developed a considerable weakness in the situation, so far are we still from a desirable status. A gratifying feature is the well sustained hope for the future. There is now but little doubt that much uncertainty has been engendered pending a settlement of the tariff question and either as a real issue or as a pretext this matter is being used as an excuse for delaying purchases. During the week practically no pig iron was sold from Chicago. About 11,000 tons of standard section rails were purchased in addition to the 8,000 tons taken by the Great Northern railway. An inquiry for 18 000 tons was received. Orders for 30,000 kegs of spikes and bolts were placed. The structural situation is very quiet with prices of fabricated material weak. The scrap market registered only a light movement of material which did not better prices. There is reason to hope that bottom prices have been reached on the present downward movement.

Pig Iron.—The pig iron market locally was exceedingly quiet during the week under review. No transactions in which any large tonnage was involved are reported. Some carload lots were disposed of, but the aggregate tonnage was light. It is generally accepted that too much iron was purchased for delivery in the last quarter of 1908 in proportion to the current melt and many shipments are now being held up as a result. A resumption of general buying can hardly be delayed beyond March, however, is the opinion of those familiar with the size of foundry stocks. Whether either the southern or local furnaces will be content to carry their present firm attitude through this period of quiet, is the most interesting speculation now current. Prices are unchanged, practically all sales conforming to the southern basis of $13 Birmingham or $17.35 delivered Chicago. We quote for Chicago delivery as follows:

Lake Superior charcoal	$19.50
Northern foundry No. 1.....	18.00 to 18.50
Northern foundry No. 2.....	17.50 to 18.00
Northern foundry No. 3.....	17.00 to 17.50
Southern foundry No. 1.....	17.85 to 18.35
Southern foundry No. 2.....	17.35 to 17.85
Southern foundry No. 3.....	16.85 to 17.35
Southern foundry No. 4.....	16.35 to 16.85
Southern No. 1 soft.....	17.85 to 18.35
Southern No. 2 soft.....	17.35 to 17.85
Southern gray forge	15.60 to 16.10
Southern mottled	15.35 to 15.60
Southern silveries, 4 per cent silicon	18.10 to 18.60
Southern silveries, 5 per cent silicon	18.35 to 18.85
Southern silveries, 6 per cent silicon	18.85 to 19.35
Jackson Co. silveries, 6 per cent.	19.90
Jackson Co. silveries, 8 per cent.	20.40 to 20.90
Jackson Co. silveries, 10 per cent.	21.90
Malleable Bessemer	17.00 to 17.50
Standard Bessemer	17.65 to 18.15
Alabama Basic	17.35 to 17.85

Billets.—The billet requirements continue to be confined to small lots of forging billets and to the completion of contracts for axle billets by car manufacturers. Prices, however, remain as firm as they have been recently, which is a much better status than prevailed through the greater part of the past 18 months. We quote as follows: 4 x 4-inch rolling billets, $26.50, and forging billets, $28.50, base Chicago.

Merchant Steel.—Bar iron manufacturers are not taking as many orders as might be considered desirable, and at the same time inquiries for round tonnages are still pending settlement of the question of deliveries. Specifications for steel bars from agricultural implement manufacturers are maintained in good tonnage. The bar mill operations of this territory do not change materially from week to week, and are at present about as last recorded. At the South Works of the Illinois Steel Co. there are now 20 open-hearth furnaces in operation, as compared with 21 a fortnight ago. All of the South Works mills are running except No. 1 rail mill and the univer-

sal plate mill. At Joliet the mills are well filled with orders, and at Milwaukee, five out of six bar mills are in operation. The trade in merchant steel from mill and store is moderate in quantity. No features of interest have developed in the price situation as regards mill products. We quote as follows:

Bar iron, 1.50c to 1.53c; soft steel bars and bands, 1.58c, half extras; soft steel angles, less than 3 x 3, 1.68c; hoops, 1.98c base, full extras; planished or smooth-finished tire steel, 1.78c; iron finish, up to 1½ x ½-inch, 1.73c base tire card; iron finish, 1½ x ½-inch and larger, 1.58c base steel card; channel for solid rubber tire, ¾ to 1 inch, 2.08c; and 1⅛ inch and larger, 1.98c; smooth-finished machinery steel, 1.83c; flat sleigh shoe, 1.63c; concave and convex sleigh shoe, 1.83c; cutter shoe, 2.95c; toe calk steel, 2.13c; railway spring, 1.93c base steel card; vehicle spring steel, 1.98c base vehicle card; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 56 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.90c to 2c, full extras; soft steel bars, 1.80c per 100 pounds base, plus half extras; soft steel hoops, 2.30c, full extras.

Plates.—Restricted building of steel cars in the west, and the fact that practically no vessel plate tonnage has been diverted to western mills, have confined the plate tonnage very largely to structural and tank requirements. This has reduced the aggregate tonnage almost to a minimum, which condition has prevailed continuously for a number of weeks. The small amount of business and resultant competition has not permitted the expected strengthening in plate prices from the condition where concessions by small mills are the rule. We quote for Chicago delivery as follows:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.78c Chicago. For extras see Pittsburg report. Shippers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 2c to 2.10c; from 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16-inch up to and including 60 inches wide, 2.10c to 2.15c; 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.10c to 2.15c. Flange and head quality, 25c extra.

Sheets.—The matter of chief interest to manufacturers of sheets in this central western territory is the making of very low rates by steamship companies from eastern to Texas and southwestern points. As compared with an all rail shipment rate from Chicago, of 74 cents, an eastern rate of 66 cents is now in force to Texas common points. The local demand for sheets has improved somewhat since the first of the year, but is confined almost entirely to galvanized and lighter gages. Prices are fairly firm. We quote store prices as follows. For mill prices see the Pittsburg report:

No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c; galvanized sheets, Nos. 10 to 16, 3.05c to 3.10c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4c; No. 30, 4.40c to 4.50c.

Structural Steel.—Contracts for structural steel were very few in number during the week past, with exceedingly light tonnage in the aggregate. The contract for the Shoaf office building at Fort Wayne, requiring 260 tons, was placed with the American Bridge Co. Three small court houses, each requiring less than 100 tons and located at Trinidad, Cal., Iola, Kans., and Carthage, Mo., were contracted for with the Christopher Simpson Structural Iron Works, St. Louis. An inquiry is in the market for about 600 tons for two bridges for the sanitary district. The plans for the Studebaker building at South Bend now call for reinforced concrete construction, for which bids are to be received Saturday. The letting of the contract for the Cook county court house, reported as going to the Alling Construction Co., is being opposed by the Thompson Starrett Co., on the grounds that the award was made on a non-competitive basis. A very fair tonnage of fabricated work is being contracted for in small lots, and the leading fabricating interest took of such contracts nearly 1,000 tons during the week. Other fabricating shops are likewise obtaining a number of such orders. The drawings for the new steel foundry of the Bettendorf Axle Co., Davenport, Ia., are being estimated upon, the tonnage being in the neighborhood of 1,300 tons. The contract for the new shop for the Falk Co., Milwaukee, involving some 400 tons, was placed with the Worden-Allen Co. Prices of fabricated material are still weak, but we quote mill prices unchanged, as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.78c to 1.81c, delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $1.95 per 100 pounds; angles over 6 inches, $2.05 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.95 per 100 pounds, base; channels, 3 inches and larger, $1.95 per 100 pounds, base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—The buying of rails seems to be confined entirely to the immediate needs of the railroads. There seems to be little disposition to buy for the future. Sales of rails during the week include one 500-ton lot, two of 1,000 tons, one 2,000-ton order, and a contract for 6,500 tons, all of standard sections. The Great Northern railway, reported a week ago as inquiring for 8,000 tons, has purchased that amount and has another inquiry in the market for 18,000 tons. The purchase of track fastenings included about 30,000 kegs of spikes and bolts. It is intimated that the withholding of railroad orders may be attributed in part to the uncertainty of the action to be taken by the various state legislatures now in session. It is very generally conceded that the market quietness is largely due to the buying attitude of the railroads. We quote as follows:

Standard Bessemer rails, $28; open-hearth, $30, f. o. b. mill in 500-ton lots and over; less than 500 tons, $2 extra, full freight to destination; light rails, 25-pound to 45-pound, $26; 20-pound, $27; 16-pound, $28; 12-pound, $29. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.15c to 2.25c; with hexagon nuts, 2.30c to 2.40c. Small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

Merchant Pipe and Boiler Tubes.—There is some little inquiry developing in advance of the spring trade in tubular goods, but the tonnage outlook is not especially encouraging. We quote mill discounts as follows:

	—Steel—	
	Black.	Galv.
¾ to 6 inches, inclusive.....	73.2	63.2
7 to 12 inches, inclusive.....	70.2	55.2

BOILER TUBES.

	Steel.	Iron.	Seamless.
2¼ to 5 inches, inclusive..	63.2	50.2	50.2

Cast Iron Pipe.—The placing of the

tonnage offered at Kansas City a few weeks ago was deferred, to be taken up again this week, in all probability. In addition, the awarding of 200 tons at Mound Ridge, Kans., 300 tons at Augusta, Kans., and 300 tons at Muscatine, Kans., is advertised for the current week. The total tonnage let in the west since Dec. 1 last is not up to what was expected, or is it sufficient to meet the requirements of a number of the larger cities which have not yet advertised lettings. Prices are firm, and we quote as follows: 4-inch water pipe, $28; 6 to 14-inch, $27; largen sizes, $26; gas pipe, $1 a ton higher.

Wire Products.—The reviving of the wire trade following the holiday season and in preparation for the coming spring months is not very active. Orders are somewhat below normal in tonnage, though moderately well sustained. There is apparent, however, no reason why the expectations of a good spring season should not be realized. We quote for Chicago delivery as follows:

Wire nails, jobbers' carload lots, $2.13; retailers' carload lots, $2.18; painted barb wire, jobbers' carload lots, $2.28; retailers' carload lots, $2.33, with 30c for galvanizing; plain wire to jobbers in carloads, 1.98c, and to retailers in carloads, $2.03. Wire rods, Bessemer, $33; open-hearth, $34; chain rods, $33, f. o. b. Pittsburg.

Old Material.—The condition of the market for old material did not change much in the last week from the situation immediately preceding. The market continues weak, with some further slight concessions in prices, but a feeling is prevalent that the bottom has been fairly well sounded. A very large proportion of the tonnage of scrap offered by the railroads a week ago was not sold, and the railroads show an inclination to hold their scrap at the present prices. As there does not seem to be any movement of stocks accumulated by dealers concessions in prices are confined to the comparatively small quantity of scrap in transit which must be moved. One local mill is reported to have purchased within the last month about 25,000 tons of heavy melting steel, and another mill is offering to take a limited amount of desirable grades, so that there is some promise of an improvement in the strength of the market. One railroad list of 2,600 tons for the Chicago, Milwaukee & St. Paul railroad is offered. We have revised our prices and quote as follows:

Old car wheels	$15.25 to 15.75
Old iron rails	18.75 to 19.25
Re-rolling rails (4 ft. and over)	15.75 to 16.25
Old steel rails (4 ft. and under)	14.50 to 15.00
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	14.00 to 14.50
Heavy melting steel	14.00 to 14.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.75 to 14.25
No. 2 R. R. wrought	12.75 to 13.25
Knuckles, couplers and springs	13.00 to 13.50
Shafting	16.00 to 16.50
Iron car axles	20.00 to 20.50
Steel car axles	18.00 to 18.50
Dealers' forge No. 1	11.00 to 11.50
Pipes and flues	10.50 to 11.00
No. 1 cast, 150 lbs. and less	13.25 to 13.75
No. 1 mill	8.50 to 9.00
Mixed busheling (Nos. 1 and 2)	9.25
Country sheet	5.50 to 6.00
No. 1 boiler cut	10.00 to 10.50
Boiler punchings	12.50 to 13.00
Cast borings	7.00 to 7.50
Mixed borings, etc.	7.00 to 7.50
Machine shop turnings	8.50 to 9.00
Railroad malleable	12.50 to 13.00
Agricultural malleable	11.00 to 11.50
Stove plate and light cast scrap	12.00 to 12.50
Old iron splice bars	16.00 to 16.50

CLEVELAND.

Ore Carrying Rates for Next Season—Some Structural Contracts.

Office of THE IRON TRADE REVIEW,
Browning Building, Jan. 19.

Iron Ore.—Some little business has been done in chartering vesels for next season at the same rates which prevailed for the past season—65 cents from ports at the head of Lake Superior, 60 cents from Marquette, and 50 cents from Escanaba. Rates were cut 10 cents all around in 1908. No further sales of ore have been reported.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Besemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—The market is extremely dull. Although prices are being well maintained on the very limited tonnage represented in transactions, it is impossible to state what would be the result if an inquiry for a large tonnage should appear. We quote, delivered in Cleveland on spot iron, as follows:

No. 1 foundry	17.25 to 17.50
No. 2 foundry	16.75 to 17.00
No. 3 foundry	16.25 to 16.50
No. 2 southern	17.35
Gray forge	14.75 to 15.25
Bessemer	$17.40 to 17.90
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.05

Coke.—The coke market for prompt delivery is very soft, and some concessions are also being made on contracts. On standard foundry coke on contracts, we quote $2.25 to $2.40, while $1.85 is the usual contract price for furnace coke. For prompt delivery we quote furnace coke at $1.60 and foundry coke at $2.15 to $2.25.

Finished Material.—While new business is disappointing, specifications on contracts are very fair. This is particularly true of shafting, on which carload specifications are much more frequent than they were for many months. Several contracts for fair tonnages of structural material have come to Cleveland concerns. The contract for a new pipe plant for J. B. Clow & Son, Coshocton, involving about 500 tons, and one for a new courthouse for Mercer county, Pa., were taken by the National Iron & Wire Co., at Cleveland. The 1,500 tons required by the Jeffrey Mfg. Co. for its new plant at Columbus, O., was awarded to the Interstate Engineering Co. T. H. Brooks & Co., Cleveland, took the contract for a new school at Sandusky. The steel for the new Mercer county, Pa., court house, about 400 tons, will be furnished by the Bourne-Fuller Co. The American Ship Building Co. has closed a contract for a new freight steamer, to be used in the pulp wood trade. The steamer is ordered by Detroit parties and will be built at the yards in that city. Jobbers report business very dull.

Old Material.—The offering of railroad lists the past week or ten days has brought to light the fact that some mills are offering higher prices for this railroad material than either dealers or brokers are offering for it. In some instances, these mill purchasers are offering prices to railroads that they are refusing to pay brokers for the same material. Some price recessions, amounting to 50 cents a ton, are noted, particularly in iron rails, heavy steel and turnings. We quote, f. o. b. Cleveland, as follows:

Old iron rails	$18.50 to 19.00
Old steel rails (re-rolling)	16.50 to 17.00
Old steel rails (under 6 ft.)	16.50 to 17.00
Old car wheels	15.50 to 16.00
Old steel boiler plate	13.50 to 14.00
Steel axles	20.00 to 20.50
Malleable iron (railroad)	15.00 to 15.50
Malleable iron (agricultural)	13.50 to 14.00
Heavy steel	15.00 to 15.50
Country mixed steel	13.50 to 14.00
Low phosphorus	17.00 to 17.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$15.50 to 16.00
No. 1 busheling	13.50 to 14.00
No. 1 machine cast	13.50 to 14.00
Iron axles	19.00 to 19.50
Axle turnings	10.50 to 11.00
Machine shop turnings	9.50 to 10.00
Grate bars	12.00 to 12.50
Pipes and flues	12.50 to 13.00
Tank iron	12.50 to 13.00
Hoop and band iron	9.25 to 9.75
Sheet iron	8.50 to 9.00
Wrought drillings	9.50 to 10.00
Stove plate	12.50 to 13.00
Cast borings	8.50 to 9.00

The Globe Iron Co., Jackson, O., blew in its stack Jan. 12, after an idleness of about three months.

CINCINNATI.

Inquiry and Sales Limited, But Prices are Firm.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Jan. 19.

Pig Iron.—Inquiry and sales the past week have been smaller than in the preceding week and the market is quiet. Some of the business pending last week has not yet been closed, however, and two 1,000-ton lots are still under negotiation. A St. Louis stove manufacturer is reported to have bought about 2,000 tons of foundry iron. There is an inquiry for from 300 to 600 tons for second half delivery of foundry iron by a melter in the northern part of Ohio and another melter in the same locality is figuring on 300 tons of malleable. The price situation remains steady and southern iron is quotable at $13 Birmingham for No. 2 foundry for either prompt shipment or any period in the first half. The southern producers are apparently willing to take on second quarter business at $13 Birmingham and there seems to be less effort to secure $13.50 for this period. Some warrants for southern iron are being offered by local scrap dealers, but so far as can be learned the holders of the warrants are not ready to accept much below the present schedule. The furnaces in the south are generally regarded as in good position to maintain their present asking prices, even though the market at present is inactive. In southern Ohio, furnaces continue to ask $15.50 at furnace for No. 2 foundry and nothing better than this seems to be quoted. It is reported that some high silicon iron has been sold during the week at less than the present basis of $18.50 at furnace for 8 per cent, but the selling agents representing the Jackson county producers deny having anything better to offer than the schedules. There is under consideration a liberal tonnage of iron which is being made a matter of special negotiation, so that the details are not given out for publication. We quote for prompt shipment and first half delivery, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.10 from Ironton as follows:

Southern foundry No. 1	$16.75 to 17.25
Southern foundry No. 2	16.25 to 16.75
Southern foundry No. 3	15.75 to 16.25
Southern foundry No. 4	15.25 to 15.75
Southern No. 1 soft	16.75 to 17.25
Southern No. 2 soft	16.25 to 16.75
Southern gray forge	14.75 to 15.25
Northern No. 1 foundry	17.10 to 17.60
Northern No. 2 foundry	16.60 to 17.10
Northern No. 3 foundry	16.10 to 16.60
Northern 8 per cent silicon	19.60

Finished Material.—Specifications on contracts are moderate and are reported to be slightly less than for the corresponding time last month. The jobbing trade is also quiet, but prices are stationary. Small orders are filled here at the following quotations:

Iron and steel bars, 1.85c to 2c, full extras. Angles 3 x 3 and over, 2.10c to 2.25c; beams and channels, 15 inches and under, 2.10c to 2.25c; small angles and architectural channels, 2c base; plates, ¼-inch and heavier, 2c; 3/16-inch 2.10c; No. 8, 2.15c; sheets, blue annealed, No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; box annealed sheets, Nos. 18 and 20, 2.55c to 2.65c; Nos. 22 and 24, 2.65c to 2.75c; Nos. 25 and 26, 2.70c to 2.80c; No. 27, 2.75c to 2.85c, and No. 28, 2.85c to 2.95c; boiler tubes, 2¾ to 5 inches, 62 per cent off base; turnbuckles, 45 per cent off; rivets, 3c base; cold and rolled shafting, 47 to 50 per cent off list; steel tire, 2.05c to 2.10c base.

Coke.—There are liberal offerings of both furnace and foundry coke for prompt shipment and the market is weak. There is practically nothing doing in the way of contracts for the next six months or for the year and consumers who are not covered are buying from hand to mouth, as spot prices are from 35 to 50 cents per ton lower than the producers are demanding on contracts. The accumulation at the ovens which occurred during the holidays when there was a falling off in consumption has not yet been worked off and spot prices are too attractive to induce the consumer to cover his future wants. In the leading coke producing districts, the following prices are asked for forward deliveries:

	PER TON.
Wise county furnace coke	$1.90
Wise county foundry coke	2.25 to 2.35
Pocahontas furnace coke	1.85 to 2.00
Pocahontas foundry coke	2.00 to 2.25
Standard Connellsville furnace coke	2.00 to 2.25
Standard Connellsville foundry coke	2.35 to 2.50

Old Materials.—The market is reported as stationary with dealers continuing to maintain prices, but there is not much activity. We quote dealers' prices here as follows:

Old No. 1 R. R. wrought, net tons	$14.50 to 15.00
No. 1 machinery, net tons	13.50 to 14.00
Old iron rails, gross tons	18.00 to 18.50
Old steel rails (re-rolling) gross tons	16.50 to 17.00
Old short lengths, gross tons	16.50 to 17.00
Old iron axles, net tons	17.00 to 18.00
Heavy melting scrap, gross tons	14.50 to 15.50
Stove plate, net tons	11.00 to 11.50
Wrought turnings	8.00 to 8.50
Cast borings, net tons	6.00 to 7.00
Car wheels, gross tons	15.50 to 16.00

Building in the leading cities for December shows a gain of 67 per cent over the corresponding period a year ago. Permits were taken out in 40 cities for the construction of 9,736 buildings, involving a total estimated cost of $39,244,274.

PHILADELPHIA.

Fair Inquiry for Foundry Iron—Two Large Building Projects.

Office of THE IRON TRADE REVIEW,
408 Central Trust Bldg., Jan. 19.

Pig Iron.—The market is in much the same condition as a week ago. There is considerable scattered inquiry for foundry iron, ranging from small lots up to 1,000 or 2,000 tons, and a limited volume of selling is reported. Pipe interests are still in the market, but have made no important purchases other than that of 20,000 tons of southern iron, taken by a local melter reported last week. This tonnage is to be delivered during the next three or four months at the rate of 200 tons per day. The iron was bought at slightly below the $13, Birmingham, basis. One large consumer of basic iron is still in the market, but its inquiry is no nearer closing than a week ago and no additional inquiry is current. The quiet market is welcomed by the majority of producers, as it will enable them to keep up with deliveries on contracts; several leading interests were so fully sold for the first quarter that this method of relief is extremely fortunate. Despite the current inactivity, prices continue thoroughly firm, delivery at eastern Pennsylvania plants, first quarter, as follows:

No. 1X foundry	$17.50 to 18.00
No. 2X foundry	17.00 to 17.50
No. 2 plain	16.50 to 17.00
Standard gray forge	16.00 to 16.50
Basic	16.75 to 17.25
Low phosphorus	21.50 to 21.75
No. 2 Birmingham	17.75 to 18.25
No. 2X Virginia	17.50 to 18.00
No. 2 plain Virginia	17.00 to 17.50

Finished Materials.—The Pennsylvania railroad has specified on its 1909 rail purchase, but has not yet given out shipping instructions. It is interesting to note that the tonnage of open-hearth rail called for is about 30 per cent of the total purchase. Two large building projects have developed in this territory. Bids close Jan. 29 on the addition to the Union League Club, which will probably cost about $650,000 and will require several thousand tons of steel. Bids close Jan. 28 on a large tobacco warehouse at Baltimore. In finished materials, generally, however, there is a distinct lull, and new business is of limited proportions. We quote: Structurals 1.75c to 1.90c; plates, 1.75c to 1.80c; refined bar iron, 1.50c to 1.60c; steel bars, 1.55c.

Old Materials.—The mills have come out victorious in their contest with dealers, which has been briskly waged for the last two months. Railroad offerings of the month were largely taken by the mills, and this tonnage,

together with some 12,000 to 15,000 tons of heavy melting steel purchased from interests which could no longer hold it, brought about a decided change late in the week. One of the largest consumers of heavy melting steel has notified dealers that it will not be in the market during the coming three months, and several other large melters have let it be known that they are not purchasing at present. As a result, steel is now being offered at $17, and this figure could probably be shaded, although accumulations in strong hands are still being held for a higher figure. Several other lines are weaker in sympathy with steel and we quote, gross ton prices, eastern Pennsylvania delivery, as follows:

Old steel rails (re-rolling)	$18.00 to 18.50
No. 1 steel scrap	17.00 to 17.50
Old steel axles	21.00 to 22.00
Old iron axles	24.00 to 25.00
Old iron rails	20.00 to 21.00
Old car wheels	16.00 to 16.50
Choice scrap R. R. No. 1 wrought	19.50 to 20.00
No. 1 yard scrap	17.50 to 18.00
Machinery scrap	16.00 to 16.50
Low phosphorus scrap	20.00 to 20.50
Wrought iron pipe	16.00 to 16.50
No. 1 forge fire scrap	15.00 to 15.50
No. 2 forge fire scrap, ordinary	10.00 to 10.50
Wrought turnings	13.50 to 14.00
Axle turnings, heavy	15.00 to 15.50
Cast borings	12.50 to 13.00
Stove plates	13.50 to 14.00

ST. LOUIS.

One Inquiry of Good Size for Pig Iron Reported.

Jan. 18.

Pig Iron.—Dealers in the St. Louis territory are considerably worked up today because of a rumor that an inquiry is out for 2,800 tons of southern iron. While no one is willing to confirm the report, it is equally true that none will deny that it has foundation. The iron, if it is to be bought, is for one of the largest St. Louis concerns. With this exception, inquiries are about the same as reported for the previous week, with prices ranging from $13 to $13.50 for No. 2, Birmingham, for future and immediate shipment. Specifications on contracts are decidedly better. Our quotations, delivered, to which the freight of $3.75 from Birmingham has been added, follow:

No. 1 southern	$17.25 to 17.75
No. 2 southern	16.75 to 17.25
No. 3 southern	16.25 to 16.75
No. 4 southern	15.75 to 16.25

Coke.—The best selected 72-hour Connellsville foundry coke is quoted at from $2.25 to $2.75 for the last half of the year, one order having been booked at the higher figure today. Prompt shipments may be had as low as $2.15 in some instances. Connellsville 48-hour furnace is held at $1.50 to $1.75 for both prompt and future delivery. The price on Virginia and West Virginia best-selected 72-hour foundry grade is held at $2.25 to $2.50, and furnace at $1.50 to $1.75, ovens. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—Work on the new Frisco railroad shops at Springfield, Mo., involving an expenditure of $1,500,000, will be resumed tomorrow. The Arnold Construction Co. is in charge, and expects to complete the job by July 1. The shops, which are to embrace a modern locomotive works, are to be in operation before the close of the coming summer. Work on the shops was discontinued more than a year ago because of the panic.

Old Material.—The demand for scrap iron manifests some little improvement, with prices ruling as follows:

Cast iron borings, free from foreign material, net tons	$ 6.00
Steel axle turnings, gross tons	12.50
Steel railroad axles, net ton	17.50 to 18.50
Iron railroad axles, net ton	19.00 to 20.00
Miscellaneous steel scrap, gross ton	12.50 to 13.50
Old car wheels, gross ton	16.00
No. 1 railroad cast scrap, net ton	12.00 to 12.50
Heavy machinery cast, net ton	13.00 to 14.00
Stove plate and light cast, net ton	11.50
Sheet iron, net tons, uncut	5.00
No. 1 railroad wrought, net ton	13.00 to 13.50
Railroad malleable, net ton	12.00 to 12.50
Heavy melting steel, net ton	13.00 to 13.50
Relaying rails, net ton	17.00 to 18.00

BUFFALO.

Consumers Ready to Buy Pig Iron for Second Half.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Jan. 19.

Pig Iron.—A feature of the present market is the desire of certain consumers to buy for last half delivery and the refusal at furnaces to consider such inquiries or make definite prices on tonnage for delivery during that period. This attitude on the part of the furnaces is believed to be the indication of firmer market conditions later on There appears not the slightest sign of bear prices in this district, quotations being substantially the same as for several weeks previous. The market presents an even tone in every way this week, selling averaging the same, with an occasional inquiry for big tonnage. Consumption at the foundries is reported as generally improved, the foundries having more orders under way than during the latter part of the year. A most encouraging feature of local trade is gleaned from reports of traveling men for iron producers and consumers, these persons being agreed that business conditions in the Buffalo district are improving in a steady, healthful way, which it is assumed, will materially benefit the market. We quote f. o. b. Buffalo as follows:

No. 1 X foundry	$16.75 to $17.25
No. 2 X foundry	16.25 to 16.75
No. 2, plain	15.75 to 16.25
No. 3	15.50 to 15.75
Malleable Bessemer	17.00 to 17.50
Gray forge	15.25 to 15.50
Charcoal	20.50 to 21.00

Finished Products.—Specifications are reaching local managers in good numbers at this time and it is said substantial business is likely to result in the early future, but so far as business closed is concerned, particularly with respect to structural steel, few transactions of importance have taken place. Probably the most notable contract let was the order given the Jones & Laughlin Steel Co., through the Buffalo office, for 1,200 tons fabricated structural by the Central City Refining Co., for its plant to be built at Syracuse. In other finished material, market conditions have not changed.

SEATTLE.

Cold Weather Interferes With Business, but Outlook is Favorable.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Jan. 15.

General conditions in the iron trade of the north Pacific coast are healthy and the outlook is brighter than for some time past. Steady improvement in most all lines continues. Most of the foundries which have been very backward in their return to normal conditions are exhibiting renewed activity and a number of firms operating on Puget Sound and Grays harbor have increased their forces. Foundries dependent upon building operations are still very quiet. The local rolling mills are operating on fair schedules and report an increase in tonnage for the past week. The opening of the cast iron pipe foundry of the Oregon Iron & Steel Co., at Oswego, Ore., has been postponed until some time in February with some doubt that it will commence operations at that time. A large Pacific coast manufacturing interest has announced its intention to commence the manufacture of gasoline engines on some considerable scale in the near future. Local shipyards are doing better and a number of small contracts for steel boats and machinery have been let recently. Unseasonably cold and severe weather has tied up all traffic throughout the northwest for the past ten days and business has suffered accordingly; but these conditions are merely temporary, as the weather is now moderating and normal conditions are expected to be restored in a few days.

Specifying on tin plate for the Alaska salmon pack is about completed. The tonnage is fully up to normal.

Pig Iron.—Buying for future delivery has been good during the past two weeks and three shiploads of about 1,000 tons each now on their way out from Great Britain have been nearly sold out at prices ranging from $22.50 to $24.50 for Cleveland No. 1. There are five ships with about 6,000 tons of pig iron all told, now on their way to north coast ports. One of these is now a month overdue; the other four are not expected until early in May. Spot iron is still scarce at northern points, but there are still fairly good stocks at San Francisco. Spot prices are high and there is very little buying for immediate delivery. We quote in gross tons:

English soft, No. 1, spot	$26.00 to 27.50
English soft, No. 1, to arrive April-May	24.00 to 24.50
Southern soft, No. 2	26.70 to 27.20

Old Material.—Slowly improving foundry conditions are making an increased demand for good machinery scrap. Prices are stiffening, but there is little tendency on the part of the foundries to buy except for immediate requirements. Wrought iron stocks are lower and dealers have raised their prices slightly. We quote in net tons, f. o. b. Seattle:

Foundry and machinery scrap	$17.50 to 19.00
Old steel rails	8.00 to 9.50
Railroad wrought	10.00 to 11.00
Country wrought and busheling	5.50 to 8.00

Merchant Iron.—Bad weather and demoralized traffic have cut severely into the dealers' sales of rolled products during the past ten days and sales have been from 10 to 25 per cent below normal. This condition is regarded as temporary, however, and in anticipation of better sales the dealers have been specifying freely on contracts with the mills. On account of revised railroad rates, the question of price has added another uncertain element to the market recently. A meeting of jobbers will be held some time before Feb. 15, to settle this matter definitely. Although it was at first thought that on account of the advance in freight rates, the prices of rolled products, particularly mild steel bars, would be raised, the sentiment now is that north coast prices at least will remain unchanged for some time to come. San Francisco interests are manifesting some tendency to break away from the decision made recently to maintain a constant differential of $4 per ton between mild steel and common iron bars. Iron bars are quoted by some California interests as high as $2.25 per 100 pounds and mild steel bars from $2.35 to $2.40. North coast prices are steady and unchanged. We quote base prices per 100 pounds, f. o. b. Seattle, common iron bars, $2.25; mild steel bars, $2.35; machinery steel, $2.75; Norway iron, $3.50; angles, channels, zees and tees, under 3-inch, $2.75.

NEW YORK.

Pig Iron Dull—Structural Contracts Do Not Form a Large Total.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Jan. 19.

Pig Iron.—The eastern situation is as quiet at present as at any time since the buying spurt ushered in by November. The largest sales reported during the week were in the 1,000-ton class and transactions of this size were not numerous. This does not seem due to a curtailment of foundry operations, as reports from both New England and the territory west of New York are that a fairly steady business is being done. In face of this quiet condition, prices apparently are being maintained in good manner, although there are rumors of concessions from the Virginia field and from one or two Pennsylvania interests. The Eastern Pig Iron Association holds its monthly meeting tomorrow. We quote New York tidewater delivery, first quarter, as follows:

Northern foundry No. 1	$17.75 to 18.25
No. 2X foundry	17.25 to 17.75
No. 2 plain	16.75 to 17.25
No. 2 southern foundry	17.25 to 17.75
Malleable	18.00 to 18.50
Basic	17.00 to 17.25
Gray forge	16.25 to 16.75

Ferro-Alloys.—Both inquiries and sales of ferro-manganese and ferro-silicon are extremely small, and the trade in ground alloys is not important. We quote ferro-manganese at $44 to $46, seaboard, according to delivery, and ferro-silicon at $65 to $66, Pittsburg, for 50 per cent.

Finished Materials.—Several structural contracts have been closed during the week, but the aggregate tonnage placed was not large. A. E. Norton & Co. will supply the steel for the Max Cohen loft building on West 27th street, 1,485 tons, and for a building on West Eighth street, 415 tons. The Central City Refrigerator Co. has given contracts to the Jones & Laughlin Steel Co. for the 1,200 tons required in its Syracuse plant, but it is possible that this will not go ahead immediately. Milliken Bros. have secured the Crane warehouse at San Francisco, 600 tons, and have taken several small orders for steel transmission towers. Other recent bookings include 300 tons for pier shed 32, East river, secured by the American Bridge Co.; 300 tons for the Gillette Safety Razor Co., to G. W. & F. Smith, Boston; 860 tons for Falk foundry to the Worden-Allen Co.; two schools at Philadelphia, aggregating 800 tons, to the McClintic-Marshall Construction Co.; and 530 tons to the Wisconsin Bridge Co., for bridge work on the Rio Grande, Brownsville & Mexico. About 500 tons required by the Hedden Iron Construction Co., for a school at Newark, will be supplied by the Eastern Steel Co. Bids have gone in on the Chase building, at San Francisco, 350 tons; the Newman & Levinson job in that city, 400 tons; a hospital and power house at Gary, 350 tons; about 560 tons of bridge work for the Wisconsin Central; 500 tons for a library at Springfield, Mass.; 600 tons for the Demarest building in this city; 600 tons for an office building at Scranton; 440 tons for the Leslie building at Kansas City; and 750 tons for the Apollo theater in New York.

The Lackawanna has let contracts for two steel barges to the New York Ship Building Co., and the Erie is on the market for six. Figures are being taken on the shipbuilding plant which Lewis Nixon is to built at Tottenville, Staten Island. A considerable amount of steel will be needed by the Norfolk & Southern for its bridge over Albermarle Sound, N. C.

The Philadelphia Rapid Transit Co. has authorized the purchase of some 10,000 tons of heavy rails. Otherwise, railroad business is quiet and no important orders are recorded. Bar iron is somewhat weaker in sympathy with scrap. R. D. Wood & Co. were low bidders on 600 tons of 6 to 12-inch cast iron pipe for Yonkers, their figure being $22.35 delivered. Bids have been taken on 240 tons for Lynnhurst, N. J., and 440 for Fall River.

Angles, 2 to 6 inches x ¼-inch and heavier, 1.76c; beams, 3 to 15 inches, 1.76c; tees, 3 x ¼-inch and heavier, 1.81c; plates, carloads, tanks, 1.76c; marine boilers, 2.16c; bar iron, 1.56c to 1.61c; soft steel bars, 1.56c; sheets, No. 28, black, 2.66c.

Old Materials.—Following the sensational break in the eastern Pennsylvania territory during the past week, scrap is quiet and inactive at lower prices. Dealers insist that there will be a return to the prices recently reached, but the fact that large tonnages have already been carried for a long period and that the most important consumers of steel are declining to buy, makes this outlook

seem rather remote. No sales of importance are noted in this territory and we quote, gross tons, New York delivery, as follows:

Old steel rails (re-rolling)	$15.50 to 16.00
Relaying rails	21.50 to 22.00
Old car wheels	14.00 to 14.50
Old iron car axles	20.00 to 21.00
Old steel car axles	19.50 to 20.50
Heavy melting steel	14.50 to 15.00
No. 1 railroad wrought	16.25 to 16.75
Iron track scrap	14.50 to 15.00
Wrought pipe	12.50 to 13.00
Cast borings	10.00 to 10.50
Wrought turnings	11.00 to 11.50
Heavy cast scrap	14.00 to 14.50
Railroad malleable	13.00 to 13.50
Stove plate	10.00 to 10.50
Grate bars	11.00 to 11.50

BIRMINGHAM, ALA.

Company Formed to Build Blast Furnaces and Other Plants.

Jan. 18.

Even with the market still reported rather quiet and the buying slow as compared as to what was expected at this time, the aggregate of pig iron deals in the Birmingham district so far this year is very satisfactory. During the past week, some of the manufacturers in the southern territory closed deals with cast iron pipe makers for a little bunch of business while some of the larger brokers throughout the country have had agents here or the heads of firms were in this district looking over the situation and putting in an oar or two in the way of an order. Buying in small lots and for practically immediate delivery has been the rule so far this year, but the aggragate, as stated, shows up nicely. There have been some deals closed for delivery during the second quarter of the year and the indications are most comfortable for a satisfactory half year already. There has been no change in quotations as yet, the $13 price, No. 2 foundry, holding.

The announcement of the formation of a company by Dr. G. B. Crowe and associates, who own and operate coal mines in the southern part of Jefferson county and in Tuskaloosa county, this state, to build two blast iron furnaces, a by-product coke plant and other industries in the vicinity of Bessemer, in the southern part of Jefferson county, is taken with considerable satisfaction and the hope is expressed that there will be an early realization of the plans which have been given out to the public. The site has been purchased.

The first all-steel dining car has just been turned out of the Pennsylvania Railroad Co.'s shops at Altoona. The car seats 30 persons and will be placed in service on the main line.

BRITISH IRON MARKET.

Steady Tone and Outlook is Very Encouraging.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Jan. 9.

The pig iron market has shown comparatively little change during the past week. The new year has commenced with a steady tone, which seems likely to be maintained. A large proportion both of buyers and sellers incline to the view that the market has commenced an upward movement, and that things have at last reached the turning point which has been so eagerly awaited. Generally speaking, it may be said that there seems to be a more encouraging outlook. Though there is no great volume of business, some little disposition is shown to purchase forward. A favorable sign is the fact that purchasers placing forward orders are willing to pay a somewhat higher price than the present standard figure. The quotation at Middlesbrough yesterday for Cleveland No. 3 warrants was 49s ($12) compared with 49s 1d ($12.02) at the commencement of the week. The continued increase of stocks at Connal's, Middlesbrough, is a disturbing factor in the situation. The present tonnage is 143,000. The hematite department continues rather slow. Makers are not over eager for new business, owing to the fact that they have fair bookings to work off. The current quotation for West Coast hematite is 56s ($13.70).

In the Midland market, interest centers on the quarterly meeting due a week hence, which it is considered will probably determine the general position for some months to come. Some extensive purchases have been made of Derbyshire pig for the making of Lancashire textile machinery for export purposes.

The finished iron trade continues dull, with a very small amount of business passing.

METAL MARKET

CHICAGO.

Jan. 19.

The demand for metals continues apathetic. Copper is selling only in small lots and for spot delivery. Fractional cutting is prevalent all along the line. One noticeable feature of the market this week is the entrance of producers of spelter into the retail market, these selling direct to consumers. Naturally, a disturbed condition has followed. Pig tin and pig lead are both offered at lower prices than a week ago. We have revised our prices as follows:

Lake copper, carload lots, 14¼c to 14½c; castings, carload lots, 14c; pig tin, 30c to 30¼c; spelter, 5.25c to 5.50c; pig lead, desilverized, 4.35c to 4.40c in 50-ton lots; corroding, 4.80c to 4.85c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c list, f. o. b. LaSalle in car lots of 600-pound flasks; Cookson's antimony, 10½c to 11c; other grades, 10c.

The demand for old metals lags in sympathy with the parent market. Dealers report ample supplies offered, but are buying only attractive lots. General prices are without change. We quote as follows:

Copper wire, 12¾c; heavy copper, 12¾c; light copper, 11½c; heavy red brass, 11¾c; heavy yellow brass, 8¾c; light brass, 6¾c; No. 1 red brass borings, 9¼c; No. 1 yellow brass borings, 9¼c; brass clippings, 8¾c; tea lead, 3¼c; lead scrap, 3¾c; zinc, 3.25c; tin plate, 24c; tin foil, 23c; pewter, 16c; electrotype plates, free from wood, 4c; electrotype dross, 2¾c; stereotype plates, 4¼c; stereotype dross, 3c; prime slab zinc dross, $55 per ton.

NEW YORK.

Jan. 19.

Copper.—The demand has been light throughout the week and this, coupled with a sharp break in the London market, has sent prices downward all along the line. We quote: Lake 14¼c to 14⅜c; casting, 13¾c to 13⅞c; electrolytic, 13⅞c to 14c.

Pig Tin.—The demoralized situation abroad has naturally weakened the local market and the decline which set in about a week ago has not yet been checked. Current selling is light at 27½c to 27¾c.

Pig Lead.—The spurt of buying earlier in the month seems to have spent itself and the market is now in a listless condition at about 4.15c to 4.20c, New York.

Spelter.—The situation is unchanged, selling being light, only a little of this metal being offered. The current price is 5.12½c to 5.17½c, New York.

Antimony.—We quote: Cookson's, 8¼c; Hallett's, 8⅛c; ordinary brands, 7¾c to 8c.

ST. LOUIS.

Jan. 18.

Lead and Zinc.—Because of a cutting down in the production of lead and zinc ore in the Missouri-Kansas-Oklahoma district last week, zinc ore

advanced to $44 a ton base, and lead was strong at $54.50 a ton. The base price for zinc ore means a high price of $47. Quite a number of mines in the district suspended operations during the past week, and it was estimated that the reduction in output reached a total of 3,500 tons. The diminution was due to the demand for gas and fuel, which was diverted to the cities when the cold wave swept over the district. Spring City continued operations in all of its plants, regardless of the weather, and the mineral from that camp was among that which commanded the highest base price. A price of $44 was also obtained for ore from Webb City, Oronoga and Alba. The bulk of Joplin ore brought $43 or less a ton.

St. Louis spelter in one week has dropped from $5.12½ to $5.05, and New York spelter is unsteady at $5.17½. St. Louis pig lead dropped from $4.12½ to $4.07½, and New York lead dropped from $4.22½ to $4.20. Silicate of zinc sold for $19 base, with a high price of $23 reported.

QUICK WORK IN MOLDING.

A very successful demonstration of pneumatic machine molding was given by the Hermann Pneumatic Machine Co., of Zelienople, Pa., with its 6 x 9-foot jarring molding machine before a large representation of Pittsburg foundrymen at the Frank-Kneeland department of the United Engineering & Foundry Co., Pittsburg, Saturday, Jan. 16.

The molding machine, which is the largest of its kind ever constructed, handled a mold 7 feet 6 inches by 4 feet 6 inches and 36 inches deep. The pattern, a side bracket for rolling mill machinery, was 28 inches deep and the casting represented a weight of 5,600 pounds. The total weight of sand, pattern and flask was 13,500 pounds. With two men shoveling the sand, the total elapsed time of the complete molding operation including the filling of flask, ramming, turning of flask and drawing of pattern, was one hour. The actual ramming consumed 32 seconds and 50 strokes were used to make the mold. Though the machine was set temporarily in a pit and was without foundations, the mold was uniformly rammed and the foundrymen present who inspected the finished work, pronounced the mold to be a good one.

The particular machine used in the demonstration is to be installed in the new plant of the Modern Foundry Co. at Oakley, O., near Cincinnati, and is to be employed in the making of castings for milling machines. The machine follows the lines of the standard Hermann product, which is operated under 60 to 80 pounds air pressure and at from 120 to 150 strokes per minute.

An economical feature of the machine is its capacity for turning out work. It is estimated that from 60 to 75 tons daily may be handled if sand and other material are available. Where large pieces of work are not at hand, three or four flasks of smaller size may be placed on the base and jarred at the same time. Two men working a full day's time at hand ramming, it is stated, would have completed two molds of the size and design made in the demonstration. From the record established by the machine, the company claims it could have turned out 10 of these molds without difficulty in an equal length of time, an efficiency gain of 500 per cent. One of the notable advantages of the machine is the successful prevention of any rebound to the sand in the jarring process.

The Hermann Pneumatic Machine Co. recently installed itself in a new plant at Zelienople, Pa. During the past several years, it has manufactured a large number of its molding machines, which are now in daily use in many leading foundries throughout the country.

SALES OF STEEL RAILS.

(Special Telegram.)

New York, Jan. 20.—The Carnegie Steel Co. rail sales are as follows: Cleveland, Akron & Columbus, 3,500; Cincinnati, Hamilton & Dayton, 1,000. The Illinois Steel Co. reports 2,000 sold to a frog and switch concern, 1,000 to the Detroit & Mackinaw, 1,000 to the Toledo, Peoria & Western, and 6,500 to the Great Northern. A good tonnage is under negotiation and practically closed.

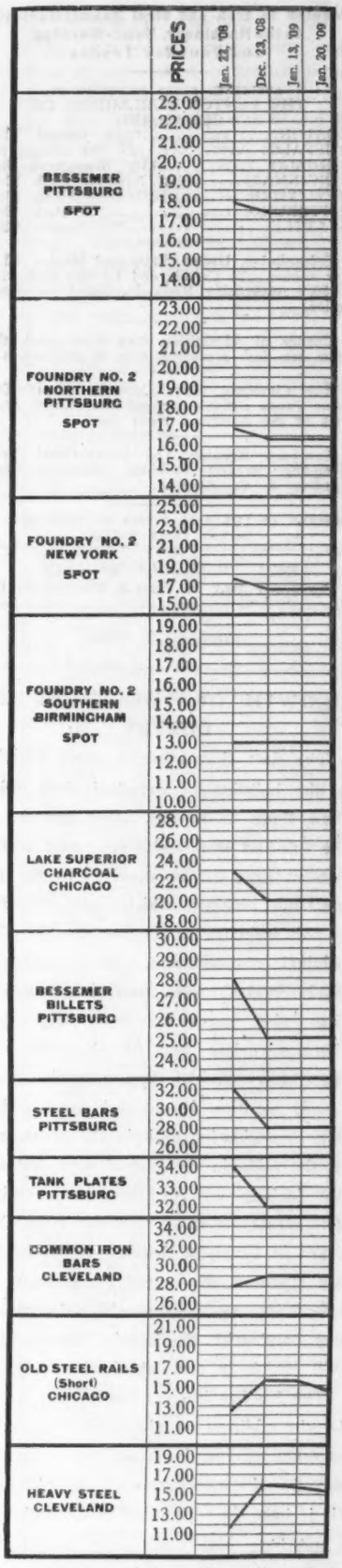
IRON TRADE MORE ACTIVE.

(Special Telegram.)

New York, Jan. 20.—The iron trade is more active. Pipe interests are inquiring much more generally. Two sales in the Buffalo field, one to a pipe interest and one lot pending, total 10,000 tons.

The Youngstown plant of the Republic Iron & Steel Co. has just re-equipped its spike department with another system of fuel oil. The system just installed is that manufactured by the Tate, Jones Co., Pittsburg, Pa. The installation of this system in this plant is due to advantages possessed by oil over gas or coal both as regards the cost of operation and results secured. The equipment includes spike furnaces, pumping, heating and regulating systems.

PRICE CHART.



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GROWTH OF THE SHEET INDUSTRY.

The fact that there is more activity in the building of detached sheet mills than there is in any other branch of the finished iron and steel trade at the present time draws attention to the remarkable changes which have occurred in this industry in the past decade. The original consolidation, the American Sheet Steel Co., was formed a trifle less than nine years ago. At that time there were less than 200 sheet mills in the country, and of these a number were poorly positioned and did not survive. The consolidation took in the great bulk of the mills in the central west, but did not include any of the eastern mills. The actual output in 1899 and 1900, both years of excellent demand, probably did not represent the output of as many as 150 mills, running steadily through a year, and with the heavier tonnage per mill which is now obtained.

The leading interest has grown, partly by the addition of absolutely new mills at some of its plants and partly by removal and consolidation of old mills, until it has, since the four mills added at Cambridge last year, a total of 186 sheet mills, all strictly operative. At one time or another in the recent past, all these mills have operated.

In the past nine years, there has been a very large amount of new erection by independent interests. A number of the projects were ill-advised and while the plants have been built, they have not been added to the producing ranks. Some have been scrapped altogether while others have been removed. An occasional mill stands on the ground with no prospect of its being operated.

Most of the new projects have survived, however, and with the new erections at several points now in progress, the independents will have a slightly larger number of mills than the leading interest. Within two or three months, there will be a total of more than 375 sheet mills in the United States in operative condition and to be counted upon as producers in times of normal demand. The capacity of these mills is much more than double the capacity of the mills in existence nine years ago, and probably triple the actual production attained up to that time.

The demand for sheets has grown much more rapidly than has demand for steel products as a whole, because many of the uses of sheets are comparatively new, and additional new uses are being found every year. The largest single line of consumption is in the electrical industry. In a sense the bulk of the sheets used in the electrical industry are used as a substitute for cast iron, but strictly speaking such is not the case for the reason that sheets have not supplanted cast iron, the demand for sheets increasing rather as the demand for electrical machinery has increased. The demand for electrical machinery has increased so rapidly largely because of its efficiency, and the efficiency was obtained largely through the employment of sheet steel rather than cast iron.

Statistics of sheet production have been gathered only for three years. The production of sheets, 13 gage and lighter, excluding black plates for tinning, has been as follows:

	Gross tons.
1905	983,437
1906	1,074,525
1907	1,084,700

Thus far our sheet industry has fallen behind that of Great Britain, in its proportion to total output. British production statistics are not gathered, but it may be noted that in 1905, the year of maximum exports, Great Britain exported 486,815 gross tons, half as large a tonnage as we produced of both black and galvanized. British exports of black sheets were light, but there must have been a moderate tonnage of both black and galvanized sheets consumed at home. In most steel products, our output has been much more than double that of Great Britain. Our prospective capacity is close to 1,500,000 tons a year, or more than 15 per cent of our prospective total capacity of rolled iron and steel.

With the assured general business revival and a continuance of the industrial peace of the past year, what good thing can I wish for the Open Shop Employer and the Open Shop Workman for nineteen hundred and nine other than Health?

JOHN J. WHIRL

Detroit, January one.

A NEEDED REFORM.

A circular which has been issued by the Association of American Steel Manufacturers advocates the simplification in the listing of all materials which are at present designed by gage numbers, such as sheet, wire, hoops,

rods, tubes, etc. This is a reform which is badly needed, and which should be adopted by all the steel manufacturers of the country. The plan suggested does not comprise the changing of any of the present standards, but simply requires that the designating gage number be dispensed with and that the size of the sheet, wire, rod, or whatever may be in question be designated in decimals of an inch.

The force of the argument for this change is apparent when the number of gages in use in the United States is considered. Materials which are designated by gage numbers may be measured by no less than seven gages, each one of which has a different meaning, and, unless it is clearly understood which gage is meant, there is plenty of chance for confusion and loss, due to errors in filling orders. The gages vary widely in all cases, the spread between the two extremes in size on No. 12 gage being between 0.105 and 0.185 inch. It is proposed in the circular that an official order be issued by all the companies manufacturing or using material designated by gage numbers providing that, effective on a given date, these materials will be described, for example, as 0.207-inch rods, instead of No. 5 rods W. and M. gage, that No. 20 U. S. standard sheets will be described as 0.0375-inch sheets, etc. The change required is one of extreme simplicity, and we commend it to the attention of our readers.

HEAVY DECREASE

In Production of Coke—Average Price Also Shows Decline.

Complete figures of the total shipments made and of the total production of the ovens during 1908, show the lightest record of the past 10 years in the Connellsville coke regions. As compiled and published by the *Connellsville Courier* in connection with its annual review of the Connellsville coke industry, shipments of the past year reached 10,700,022 tons compared with 19,029,058 tons the preceding year, a decline of 8,329,036 tons.

The coke actually made by the Connellsville ovens in the year totaled 9,704,413 tons according to the weekly reports of the *Courier*. The apparent discrepancy between the shipments and production is due mainly to the fact that a large amount of stock coke was on hand at the start of the year and this was forwarded to consumers in addition to the current output. The total shipments from the main Connellsville and the lower Connellsville regions by months during 1908, were as follows:

	Connellsville region.	Lower Connellsville.	Grand total, tons.
January	499,677	242,419	742,096
February ...	532,215	278,221	810,436
March	531,882	309,177	841,059
April	477,893	295,022	772,915
May	469,459	290,354	759,813
June	473,892	298,475	772,367
July	572,832	284,011	856,843
August	621,090	331,402	752,492
September ..	621,242	354,364	975,606
October	636,070	394,482	1,030,552
November ...	613,333	382,474	995,807
December ...	758,013	432,023	1,190,036
Totals	6,807,598	3,892,424	10,700,022

OUR ANNUAL CHART.

The annual chart published by THE IRON TRADE REVIEW Jan. 14, shows fluctuations in the prices of iron and steel products and covers changes in quotations for the past 14 years. A few extra copies have been printed, and will be sent, on application, in tubes to subscribers who desire to frame them. The chart is the same size as that of last year and can be easily placed in the frame then used. The chart is a wax engraving in four colors, and gives the prices of the following products: Steel bars, Pittsburg; tank plates, Chicago; beams, Pittsburg; bar iron, Cleveland; Bessemer billets, Pittsburg; Bessemer pig iron, Pittsburg; No. 2 foundry, Chicago; gray forge, Cincinnati; No. 2 foundry, Birmingham.

The total shpiments of coke from the entire Connellsville region for the past 10 years together with the oven capacity and the average selling price according to the figures of the *Courier,* are as follows:

Year.	Total ovens.	Tons shipped.	Average price.
1899.....	19,689	10,129,764	$2.00
1900.....	20,954	10,166,234	2.70
1901.....	21,575	12,609,949	1.95
1902.....	26,329	14,138,740	2.37
1903.....	28,092	13,345,230	3.00
1904.....	29,119	12,427,468	1.75
1905.....	30,842	17,896,526	2.26
1906.....	34,059	19,999,326	2.75
1907.....	35,697	19,029,058	2.90
1908.....	37,842	10,700,022	1.80

At the start of the year, there was less than 38 per cent of the oven capacity of both regions in operation. In February and March, the otuput was 40 and 42 per cent, and in April, May and June, 38 per cent. In July it rose to 43 per cent, dropped in August to 37 per cent and in September again rose to 48 per cent. The record of October was 51 per cent, which slightly decreased to 49 per cent in November. The record of 60 per cent in December was the highest attained in the year.

The actual output of the two regions during the year and the total capacity of available ovens at the end of the year, were as follows:

	Ovens.	Output, tons.
Connellsville	24,510	5,768,411
Lower Connellsville	13,332	3,936,002
Total	37,842	9,704,413

A net gain of 2,107 ovens in the year is shown by the *Courier's* statistics. In the upper regions the following ovens were abandoned in the year: Atlas 212, Leith 4, Mt. Braddock 170, Sterling No. 1, 25, Pennsville 67, Percy 21, Tyrone 18, total 517. In the lower regions the abandoned ovens were Husted 100, Low Phos 1, total 101. The list of new ovens in both regions is as follows: Shannon 2, Redstone 1, Colliers 400, Standard 2, York Run 80, Carolyn 32, Carbon 57, Dunn 50, Elizabeth 80, Little Sunshine 20, Madison 45, Marthabel 40, Cyrilla 2, Champion 40, Browning 20, Brownsville 50, McGee 40, Colonial No. 3, 156, Parshall No. 1, 2, Dorothy 12, Edna 2, Genuine 58, Hoover 60, Martin 3, Old Home 32, Sterling 160, Tower Hill No. 1, 148, Tower Hill No. 2, 162, Garwood 31, Hope 38, Eleanor 80, Dearth 250, Ronco 350, Phillips 220, total 2,725.

The year saw the beginning of work on four new plants of the H. C. Frick Coke Co. in the lower regions. These are the Palmer, Filbert, Ralph and Sarah, three of which are intended for coking works with a total of 1,500 ovens, and the other for a coal producer. It is estimated at the close of the year that construction work upon 6,000 new ovens in both regions is under way.

As to prices, the *Courier* fixes the average for the year for both furnace and foundry coke at $1.80 ovens per ton compared to $2.90 per ton in 1907. The average price of furnace coke of producers not subsidiary to furnace interests, was $1.70 ovens and of foundry $2.10 ovens. During April, May, June and July it is stated spot furnace sold down to a minimum of $1.30 ovens and foundry coke to $1.85 ovens.

REPAIRING FURNACES

In Hanging Rock Region Lends an Air of Activity to Several Plants.

Ironton, O., Jan. 18.—While there has been but little change in market conditions during the past week in the Hanging Rock region, much activity is shown about the furnaces in the matter of repairs. The Ashland Coal & Iron Co.'s and the Norton stacks at Ashland, Ky., are both idle, but the latter is being repaired and put in shape for operation within the next few weeks.

The Sarah furnace stack, which blew out for repairs, will probably go into blast not later than Feb. 1 and sooner if it is decided not to dry out the stack.

The Hamilton stack of the Hanging Rock Iron Co., which has been out of blast for several months, will make its first cast on Feb. 1. Extensive repairs have been made at the plant and the company has stock on hand for a long run. The stack will be put on Bessemer.

The stockholders of the Bird Iron Co. elected the following directors: Levi D. York and W. G. Williams, Portsmouth, O.; E. J. Bird, Geo. W. Keye, A. C. Stephens and D. C. Davies, Ironton; F. R. Rhodes, Cincinnatti. While there were a number of changes in the directorate, there may be no change in the organization, which is not yet effected.

The stockholders of the Ironton Iron Co. re-elected as directors: Col. H. A. Marting, C. B. Fowler, W. A. Murdock, D. C. Davies, A. H. Mittendorf, E. O. Marting, F. L. McCauley, Dr. A. C. Lowry and Chas. Peters, all of Ironton. The report for the first six weeks' run of the new plant was entirely satisfactory to the stockholders. The same officers will be elected.

The Ironton Malleable Co. will have a stockholders' meeting Feb. 7, for the purpose of formally ratifying issuing $50,000 to $75 000 of preferred stock, the proceeds of which will be utilized in the establishment of a trade for the new plant, which has been in active operation for some weeks. Oscar Richey, of the Kelly Nail & Iron Co., is the new president of the company and will, it is said, take a large share of the preferred stock issue.

The Portsmouth Machine & Casting Co. has received an order from the Newport (Ky.) Steel Co. for 200 ingot molds. As the capacity of the plant is eight molds a week, the order will insure operation the greater part of the year.

Ground has been broken for the mine car and car wheel factory to be erected at St. Albans, W. Va., by C. C. Buery, W. E. Mohler, Judge Geo. W. Atkinson and associates.

The United States Steel Co. has just completed the opening of its coal operations and coking plant at Gary, W. Va., at an expense of probably $1,000.000, and will supply the western mills of the company with fuel.

Carl Steinbacher, superintendent of the Belfont Iron Works Co.'s furnace, met with a serious accident last week. While he was at the Norton furnace, at Ashland, which is undergoing repairs, a brick fell a distance of 60 feet, striking him on the head. For several days his life was despaired of but he is now recovering slowly.

ANNUAL REPORT OF THE MIDVALE STEEL CO.

At the annual meeting of the Midvale Steel Co., held Jan. 11, at Philadelphia, Charles J. Harrah was re-elected president, James F. Sullivan, vice president, and Charles B. Dunn, Axel E. Petrie, Howard Sillers were re-elected directors. The reports for the year show that a net profit of $306,272 was made after charging off depreciation of 10 per cent on the plant, machinery and tools. Dividends to the amount of 10 per cent were paid during the year, the plant was not closed down, but operated at about 60 per cent of its capacity. The general balance sheet as of Oct. 31, 1908, compared as follows:

ASSETS.	Oct.31,1908.	Oct.31,1907.
Plant, land, buildings and equipment	$10,014,418	$10,187,014
Worked material	1,657,751	1,839,456
Raw material	378,399	389,232
Merchandise, coal and stores	362,802	398,655
Bills and accounts receivable	785,827	982,960
Bond investment	44,480	.....
Cash	87,541	183,327
Total	$13,331,221	$13,980,543
LIABILITIES.		
Capital stock	$ 750,000	$ 750,000
Bills payable	875,000	1,200,000
Accounts payable	395,590	788,225
Sundry com. accts	167	375
Surplus	11,310,464	11,241,943
Total	$13,331,221	$13,980,543

Stock Allotted Employes.—The United States Steel Corporation has this year allotted 33,000 shares of stock for sale to its employes under the profit-sharing plan adopted some years ago. For the first time there is an offering of common stock, 15,000 shares being available at 50 and 18,000 shares of preferred at 110. Heavy applications are being received, and the privilege of subscribing will expire Feb. 4. Last year 25.000 shares of preferred were distributed among the employes, who had subscribed for more than 60,000.

INDEPENDENT PNEUMATIC TOOL CO.'S ANNUAL MEETING.

At the annual meeting of the stockholders of the Independent Pneumatic Tool Co., held at Jersey City, N. J., the following directors were elected: James B. Brady, W. O. Jacquette, New York city; John P. Hopkins, M. S. Rosenwald, James J. McCarthy, S. Florsheim, John M. Glenn, John D. Hurley, Chicago, and John R. Turner, Jersey City, N. J. These directors organized at a meeting held in Chicago by choosing the following officers: James B. Brady, president, New York city; W. O. Jacquette, first vice president, New York City; John D. Hurley, second vice president, Chicago; A. B. Holmes, secretary and treasurer, Chicago.

The annual report shows that the company is in excellent financial condition, and that during the quarter ending Dec. 31, 1908, 40 per cent more business was transacted than during the corresponding period of 1907. This company manufactures the Thor piston air drills, reversible flue rolling, reaming, tapping and wood boring machines, pneumatic riveting, chipping, calking and beading hammers, pneumatic saws, motor and other air appliances. It has sufficient orders on its books to keep its plant at Aurora, Ill., running for several months at its full capacity. Its export as well as domestic business is improving, and there is every indication that 1909 will be the banner year for business since the organization of the company.

Prizes to Employes.—The Burden Iron Co., Troy, N. Y., divided over $1,000 in prizes among its employes Jan. 9. Six months ago, the management announced that, at the beginning of the new year, prizes apportioned for the best workmanship combined with steady work, would be distributed. One heater received $200, a helper $30, a roller $60, etc., the prizes being graded. In addition, $500 was distributed under the same conditions to men employed in the packing room of the plant. It was announced by John L. Arts, general manager of the company, that, at the beginning of the usual summer shut down, another distribution of prizes will be made.

In a disastrous fire at Philadelphia, Jan. 17, considerable damage was done to the machinery shop of H. Swoboda & Co. and the iron warehouse of Rhoades & Mahoney.

BLOWER CONSOLIDATION.

American Blower Co. Takes Over Sirocco Engineering Co.

Announcement is made that the American Blower Co. has consolidated with the Sirocco Engineering Co., of New York. S. C. Davidson, of the parent Sirocco works, Belfast, Ireland, is financially interested in the deal. The factory of the Sirocco Engineering Co., at Troy, N. Y., and the plants of the American Blower Co. at Detroit will continue in full operation, under one management, and the home office will be at Detroit. The capital stock is increased from $500,000 to $1,500,000. All business will hereafter be transacted under the name of the American Blower Co. The personnel of the management is indicative of its foremost position. The president, James Inglis, has been the executive head of the American Blower Co.; the vice president, William C. Redfield, was president of the Sirocco Engineering Co.; the treasurer, Charles H. Gifford, was until about one year ago general manager of the B. F. Sturtevant Co.; the secretary, Mr. Still, is well known as chief engineer of the American Blower Co.

In consummation of the consolidation, the American Blower Co. purchased the complete foundry and plant formerly operated by the Northwestern Foundry & Supply Co., Detroit. The large property occupied by the American Blower Co. having been entirely covered by the completion of a steel plate fan shop and office addition, the company recently purchased a large tract of land across the street upon which it is expected new buildings will be erected, covering, approximately, 175 x 300 feet.

Emergency Quickly Met.—In times of emergency and when all conditions are favorable, the ease with which shop records for quick work are shattered furnishes a suggestion of the efficient organization of the modern plant. This fact finds illustration in the achievement just made by Mackintosh, Hemphill & Co., Pittsburg, in their iron foundry. The Maryland Steel Co., Sparrows Point, Md., having suffered an accident to its blooming mill engine a short time ago, resulting in the breaking of the bedplate, ordered a substitution of the damaged parts within the earliest possible period. The Mackintosh-Hemphill Co. immediately went to work upon the job, and the manufacturing operation from drafting room and pattern shop to the foundry was rushed through with all speed. Ten days after the work was started, one of the large castings was ready for shipment in the rough. The duplicate casting quickly followed the first through the foundry, and the actual work put upon it was also completed within ten days time. The finished bedplate weighs about 120 tons, the two parts being of 60 tons each, and it was cast of special high strength iron. Special arrangements had been made by the railroads for quick shipment to the plant of the Maryland Steel Co., and within a space of but four weeks from the time of the accident, the damaged parts of the engine were being replaced.

PROPOSED TONNAGE TAX.

The long continued agitation of the tax question in Minnesota, in which the owners of iron ore mines are greatly interested, has been again renewed following the decision of the supreme court of that state that an amendment giving to the legislature a much wider latitude in tax matters, had been legally passed. The present taxation scheme is based on tonnage in the ground and classifies the deposits under a scale of valuation corresponding to a scale of tonnage magnitudes, so that the larger the deposit the greater the taxation. This arrangement has been unsatisfactory largely because the valuations have been considered too high and because the small output each year has been made to carry the taxation of perhaps a very large deposit. The small mines, of course, escape with a light burden.

A bill has just been introduced which imposes on all mines shipping ore running 49 per cent natural and over in iron, a tax of 5 cents a ton in lieu of all other taxes for state purposes. All other ore bearing property is to be taxed on an ad valorem basis. The bill does not affect the taxes for local purposes to which all the mining property is subject. The imposition of a tonnage tax has been opposed most vigorously by the mining interests and a continued fight to test its constitutionality will undoubtedly be waged. The increase of revenue to the state as the result of the enforcement of a tonnage tax law would be very apparent. The present valuation of the mines of Minnesota aggregates $190,000,000 and the taxes paid to the state in 1908 by the mining interests was $599,400. With a tonnage tax this sum would be increased on the basis of 1908 shipments to $861,580 and under ordinary circumstances to nearly $1,500,000.

CONVENTION OF THE AMERICAN FOUNDRYMEN'S ASSOCIATION.

The annual convention of the American Foundrymen's Association and allied bodies, including the Foundry and Manufacturers' Supply Association, the American Brass Founders' Association and the Associated Foundry Foremen, will be held in Cincinnati during the week of May 17. The meetings of the American Foundrymen's Association will be held on May 18, 19 and 20, while the exhibits of foundry equipment and supplies, which will be conducted by the Foundry and Manufacturers' Supply Association, will be open for inspection the entire week. The Hotel Sinton has been selected as headquarters.

Secretary Richard Moldenke in his announcement requests that foundrymen prepare papers and select subjects for discussion at this gathering which can be used by all of the members to their mutual advantage. He states that a mere memorandum embodying the idea will be highly acceptable, and the subjects will be thoroughly discussed by those familiar with the work.

The exhibit of foundry equipment will be conducted under the auspices of the Foundry and Manufacturers' Supply Association and will be held in Music Hall, where ample space is provided for both the still and operating exhibits. The first floor of the hall contains about 27,000 square feet of floor space and the second floor about 14,000 square feet.

Columbia University is to give a course of lectures on the general subject of elevating and conveying materials and the transmission of power, this being possible through the subscription of a $600 fund by the following concerns: Brown Hoisting Machinery Co., Cleveland; Dodge Mfg. Co., Mishawaka, Ind.; J. M. Dodge Co., Philadelphia; Jeffrey Mfg. Co., Columbus, O.; C. W. Hunt Co., West New Brighton, N. Y.; Heyl & Patterson, Inc., Pittsburg; Link Belt Co., Philadelphia; and Darley Engineering Co., Pittsburg.

Wm. B. Scaife & Sons Co., Pittsburg, Pa., has received a contract from the Maryland Coal Co. for a steel tipple and trestle to be erected at St. Michael, near Johnstown, Pa. The tipple will be one of the largest ever constructed in that part of the state.

PERSONALS.

E. E. Brosius, who has been sales manager of the Morgan Engineering Co., Alliance, O., has resigned.

Hywell Davies has been appointed general manager of the operating department of the Central Coal & Iron Co., operating mines in Kentucky.

J. E. Ruby, manager of the Winnipeg branch of the Frost & Wood Co., has been transferred to the company's head offices at Smith's Falls, Ont.

J. A. Andrews, president of the Newport Rolling Mills Co. and the Andrews Steel Co., Covington, Ky., is reported seriously ill at his home.

John P. Cosgrow has been appointed district manager of the Allis-Chalmers Co., with offices in the El Paso & S. W. building at El Paso, Tex.

S. H. Landcraft, who has been representing the Sheridan Stove Mfg. Co., Quincy, Ill., in the east, has been transferred to the Iowa and northern Missouri territory.

Geo. W. Smith, general superintendent of the Seneca Transportation Co., the marine department of the Lackawanna Steel Co., has been chosen president of the Central Railway Club, at Buffalo.

J. W. Driscoll, for over a quarter of a century manager of the Winnipeg branch of the McClary Mfg. Co., of London, Ont., has retired, and is succeeded by J. J. Foote, late sales manager at London.

Alvah C. Smith, blast furnace superintendent for the Republic Iron & Steel Co. at Youngstown, has resigned his position. He was succeeded by Joseph Searight, formerly with the Carnegie Steel Co. at New Castle, Pa.

Thomas H. Mathias has been appointed assistant general manager of the Lackawanna Steel Co. Mr. Mathias was formerly with the Illinois Steel Co., but has been with the Lackawanna company for some years.

John O'Keefe, of Cleveland, has been appointed superintendent of the South Sharon works of the American Steel & Wire Co., succeeding George A. Paff, who has taken charge of the mill of the Griswold Wire Co. at Sterling, Ill.

J. C. Houck, superintendent of the Forbes Malleable Iron Works, Rockford, Ill., has resigned to become superintendent of the Valley Field Iron Works, Montreal, Can. He has been succeeded as superintendent at Rockford by Claude Windquist.

T. S. Taggart, general superintendent of the Missouri Malleable Iron Works, East St. Louis, has resigned and has been succeeded by H. T. Fero, of Brantford, Canada. Mr. Taggart will make an extended tour of Europe.

Robert Mather, president of the Rock Island Co., has been elected president of the board of directors of the Westinghouse Electric & Mfg. Co., succeeding E. C. Converse, who has occupied the position of temporary chairman. Charles E. Terry, who has been the company's attorney and secretary, was elected vice president. His successor as secretary was not chosen. Neal Rantoul resigned from the board of directors.

OBITUARIES.

William A. Robbins, general superintendent of the Delaney Forge & Iron Works, Buffalo, died there Jan. 3.

Henry E. Robinson, head of the Robinson Machine Co., Richmond, Ind., died Jan. 10 by shooting himself in the head.

Henry C. Jones, at one time an officer of the Hilles & Jones Co., ma-

CHARLES R. JONES,

Secretary and Treasurer of the Frazer & Jones Co., Syracuse, N. Y., who died Jan. 8.

chinery manufacturer, died Jan. 3 in Wilmington, Del.

Joseph H. Long, president of the Long & Allstatter Co., manufacturer of farming implements and power punching machinery, died Jan. 3 at his home at Hamilton, O., aged 51 years.

Peter Kerner died Jan. 18 at his home in Pittsburg, aged 63 years. Born in Germany, he came to America when 10 years old, and after serving as a foundry apprentice, in 1873 entered the employ of Riter & Conley. Later, he was made superintendent of the company, and at the death of Mr. Conley, was chosen a director and superintendent of the Riter & Conley Mfg. Co. At the time of his death he was vice president of the Kerner Mfg. Co. and an officer in other corporations.

B. Franklin Jones, for five years superintendent of the Westmoreland Coal Co., died Jan. 14 at Atlantic City. He was formerly division superintendent of the H. C. Frick Coke Co., and was at one time president of the Mining Institute of America.

William Burrow, of the firm of Burrow, Stewart & Milne, iron founders, Hamilton, Ont., died Jan. 1. He had been in business in Hamilton for nearly half a century and was born in Devonshire, England, in 1838, coming to Canada when a young man.

Elijah S. Pierce, prominent as an inventor of screw machines, died Jan. 13, at New Haven, Conn., aged about 80. He was connected during the civil war with the Colt armory, at Hartford, later becoming superintendent of the National Screw Co. In this capacity he designed and built a large variety of screw machinery which made him one of the pioneers in this field. Twenty-five years ago he opened a screw factory at Mt. Carmel, and more recently was associated with Sargent & Co.

Geo. W. Hartman, a prominent business man of New Castle, Pa., died in that city, Jan. 12, aged 69. He had been engaged in some branch of the iron and steel industry for many years, at the time of his death being associated with G. W. Johnson, dealer in Bessemer limestone. At various times he was with the Arethusa Iron Works, which was succeeded by the Neshannock Sheet & Tin Plate Co. and the Norway Iron & Steel Co., serving as treasurer of these two companies. Mr. Hartman's father was an early Pittsburg foundryman, having been engaged in that business under the firm name of Stackhouse & Hartman.

Charles E. Whitman, president of the Whitman Agricultural Co., of St. Louis, and a pioneer agricultural implement manufacturer, died Jan. 7 at his home in that city. He was born in 1837 at Winthrop, Me. On leaving home, Mr. Whitman accepted the management of Walter A. Wood Reaping & Mowing Machine Co.'s branch house in Chicago. In 1870 he removed to St. Louis and with his two brothers established the Whitman Agricultural Works. Later the company was reorganized and the capital increased, the name being changed to the Whitman Agricultural Co., and later the present large plant was erected. He was a member of the Manufacturers' Association and several clubs.

AMONG MACHINERY MAKERS.

MILWAUKEE.

Annual Meeting of Allis-Chalmers Managers.

Milwaukee, Wis., Jan. 18.—One of the important events in the Milwaukee machinery field during the past week was the annual meeting of the district managers of the Allis-Chalmers Co., held at the club house at West Allis and at Milwaukee. The meeting, called for the interchange of ideas and the discussion of sales policies, was a most successful one. Almost to a man, the managers from all parts of the United States and Mexico, expressed themselves as satisfied with the past year, considering general business conditions, while the unanimous opinion seemed to be that the year 1909 would be especially satisfactory.

District managers from other cities who were present were: J. L. Watson, Atlanta, Ga.; J. C. M. Lucas, Baltimore; E. T. Pardee, Boston; C. R. Tatum, Buffalo; J. W. Gardner, Chicago; F. C. Colwell, Cincinnati; W. B. Huskey, Cleveland; J. U. Jones, Dallas; Otto F. Purnell, Deadwood; R. B. McConney, Denver; P. F. W. Timm, Detroit; J. P. Cosgro, El Paso; A. E. Mosier, Kansas City; H. C. Holtoff, Mexico City; R. H. Zavitz, Minneapolis; F. C. Randall, New York; St. John Chilton, Philadelphia; J. W. Murray, Pittsburg; F. L. Bunton, St. Louis; F. E. Marcy, Salt Lake City; H. D. Scribner, San Francisco; F. L. Webster, Seattle.

The meeting began on Jan. 11 and ended with the annual banquet at the Hotel Pfister, Milwaukee, given by President W. H. Whiteside, of the company, on Jan. 13. A magnificent hall clock, as a token of esteem, was presented to President Whiteside by the district managers.

The Sivyer Steel Co., recently incorporated with a capital stock of $25,000, will give to Milwaukee another large manufacturing plant. The incorporators are Fred L. Sivyer, vice president of the Northwestern Malleable Iron Co., of Milwaukee, William C. Frye and Donald Fraser. One of the foundry buildings of the Northwestern Malleable Iron Co. will be rented by the new company and present plans are that the plant will be in operation within 30 days. Crucible steel castings will be manufactured. Only two furnaces will be used at the present time, but plans are under way for the installation of other furnaces. The present plant to be occupied by the new concern is 200 x 70 ft. and 200 men will be employed at once. The new company will not in any way be connected with the Northwestern Malleable Iron Co.

The past year witnessed only a small decrease in the machinery output of the Milwaukee suburb of South Milwaukee. The total output reached the figure of $5,000,000, in which the Bucyrus Co., manufacturer of steam shovels and dredging machinery, led the list, owing to the fact that it has on hand a large contract with the government for the manufacture of heavy steam shovels for use on the Panama canal. One new concern, the Badger Malleable Iron Co., was established at the suburb last year and is about ready for operation. Its new plant cost $50,000. The Bucyrus Co. made improvements at its plant costing $25,000 and the Stowell Mfg. & Foundry Co., improvements aggregating $10,000.

Plenty of activity is reported by the Pressed Steel Tank Co., of West Allis. Work is rapidly progressing on the new 120 x 120 addition which is being erected and orders are arriving at a most satisfactory rate. The new addition and the equipment which will be installed, will represent an investment of between $25,000 and $30,000. The plant will be used in the manufacture of the seamless steel barrels.

Frank J. Edwards, former Milwaukee sales manager of the Western Malleable & Gray Iron Co., has been made manager of the new Milwaukee salesrooms of the Kissel Motor Car Co., corner of Fourth and Poplar streets.

The contract for erecting a dam and power plant across the Peshtigo river near Crivitz, Wis., has been awarded to the Bates-Rogers Construction Co., of Chicago, by the Northern Hydro Electric Power Co., of Oshkosh, Wis. It is understood that the entire expenditure involves nearly $1,000,000. When completed the new plant will furnish power to Green Bay, Wis. The Allis-Chalmers Co. will furnish generators and turbines, and the Aermotor Co., of Chicago, the steel towers.

Cleveland stood eighth in the percentage of gain made by cities in building for the month of December.

INDIANAPOLIS.

New Companies Organized—Oliver Receivership Ended.

Indianapolis, Jan. 18.—The Western Machine Works, recently organized, have moved into the new brick factory building in West Market street and will do repair and general machine work. George M. Schlotzhauer is president and owner, and Charles Scholl, general manager.

Rubush & Hunter, architects for the proposed $600,000 city hall building, state they will have their detailed plans completed about Jan. 25, and ready for the approval of the board of public works. The latter will then ask for bids for the construction work.

A new company at Evansville is the Hygiene Metal Cabinet Mfg. Co., which will begin business as soon as its factory building is equipped. The company has $20,000 capital stock and will manufacture steel enameled kitchen cabinets. Charles F. Schroder, John H. Schroeder, and Claude A. Ellis are the directors and principal stockholders.

J. D. Oliver, head of the Oliver Chilled Plow Works, South Bend, has purchased the interests of Irving A. Sibley in the South Bend Malleable Steel Range Co., thus ending the receivership proceedings instituted recently by Sibley. Improvements amounting to $150,000 will be made to the plant.

The Hill Machine Co. has been organized at Anderson for the purpose of conducting a general machinery manufacturing business. The capital stock of $45,000 is held by H. Hill, F. J. Hill and Ernest N. Hill.

A lease on the building recently vacated by the Speed Changing Pulley Co., in East Washington street, has been taken by J. N. Willys, president of the Overland Automobile Co., and E. B. Campbell, and 300 Marion automobiles will be manufactured this year. The two men recently purchased a controlling interest in the Marion Motor Car Co., and the old Marion factory is now being used for the manufacture of Overland engines.

The Insley Iron Works reports that it has received a large number of orders for its new cement self-dumping, center dump buckets, orders coming from Florida and West Virginia.

BUFFALO.

Volume of Business Fair and Prospects Encouraging.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Jan. 12.

The tone of the machinery market in the Buffalo district is holding up in a satisfactory manner and although the business being transacted does not include many orders for heavy equipment, the average on engines, motors and tool machinery of the light factory and power house type is above that of any period of 1908. The gain in strength of this market has been apparent since the latter part of 1908 and it is evident that the improvement was not of a sensitive or temporary character. January indications and business transacted are reported gratifying in most quarters.

The Empire Electric Co., of Franklinville, N. Y., is in the market for a 300-kilowatt alternator and engine for electric lighting purposes. The Oswego Falls Pump & Paper Co., of Fulton, N. Y., is also looking for a 300-horsepower engine and equipment. It was learned here today that the Allis-Chalmers Co. had been awarded the contract to install a 20 x 42 350-horsepower Corliss engine in the plant of the Graves, Mambert & George Co., Buffalo. The same company will equip the Kelley Island Lime & Transport Co., of Clarence, N. Y., with two No. 6 stone breakers, one 200-horsepower motor, one 160-horsepower motor.

The order for equipment of a flour mill at Warsaw, N. Y., Roberts Bros. Co., has not been placed. This equipment will include a 150-horsepower engine. Indications for prospective business are considered above the average.

CINCINNATI.

Dullness Attributed to Various Causes —Large Jeffrey Inquiry.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Jan. 19.

Orders for machinery in January have been somewhat disappointing here and the past week has been a quiet one with no material change to be noted. Manufacturers attribute the falling off in the demand during January to the agitation in regard to tariff revision and to the fact that a number of manufacturing concerns and corporations are busy with inventories and that a number of annual meetings are being held this month. The outlook for the future is, however, better than it has been at any time since the depression began. There is more inquiry and a quite general feeling of confidence that business in machine tools is on the up-grade. Some of the shops are making improvements and adding to equipment, which is evidence that better things are expected. The most notable list which is under consideration is that of the Jeffrey Mfg. Co., of Columbus, O., which is in the market for some 40 to 50 machines, which will mean an expenditure of about $75,000.

The Lodge & Shipley Machine Tool Co. is putting in concrete floor in a portion of its shop and expects to put in concrete to replace the wooden floors as fast as the wooden floors wear out. The company is also remodelling its office, contemplating much more commodious quarters for the working force and the heads of the concern. A new stock-keeping system is also being installed, and the assembling department is being changed, utilizing the new large addition recently completed. The company is building a 54-foot lathe for the government, which is now under construction in the main shop.

The Cincinnati Shaper Co. has added to its line of gear-cutting machines a 72-inch size and the first of these machines will be set up this week. The company has also a large shaper practically completed for export, which is a duplicate order from a customer who already has put two of these machines in use.

The John Steptoe Shaper Co. is adding to its equipment a Brown & Sharpe miller, an American drill grinder and a Higley cut-off saw.

The Rahn-Carpenter Co. is waiting on further advices from parties at Anderson, Ind., before beginning the erection of its foundry and shop in that city. It is contemplated to use the foundry to make the castings for the company and the shop will be used for making the large size tools.

The Cincinnati Machine Tool Co. has been fortunate in securing a number of nice orders during the past week, and the outlook is reported by this company as especially encouraging.

The Steel Foundry Co., of Cincinnati, was sold on Jan. 15 to the Armor Foundry Co. The sale was approved by Judge Warner of the insolvency court. Under the sale the Armor company secures all of the assets, exclusive of cash, amounting, according to the inventory, to about $136,000, for $80,000, payable $5,000 per month until the entire amount is paid. The Armor company has a $200,000 plant at Matthew, Ind., and the plant here will be opened at once and operated to its full capacity as soon as arrangements can be made to do so. The failure of the Steel Foundry Co. was due to the inability of its managers to secure and keep skilled workmen. Its liabilities were less than $100,000, and the receipts from the sale will allow the company to pay all creditors in full, but the stockholders will get nothing.

PITTSBURG.

Many Inquiries for Estimates, but Few Orders.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., Jan. 19.

Makers of machinery continue to receive many requests for estimates on equipment from iron and steel plants, but are closing proportionately little business. A number of the manufacturers of sheets and some of tin plate are getting prices on additional mills for present plants and several complete new works are projected. There is also considerable inquiry for pipe-making equipment and manufacturers of pipe, having enjoyed a comparatively good year, are showing a disposition to get their plants in shape for an expected increase in business, for which the prospects in this market are good. The usual result of a light current volume of contracting is being shown by the low prices that are being named in some cases where competition is close.

G. W. McClure, Son & Co., Pittsburg, have just completed the installation of seven additional stoves of the McClure type at the blast furnace plant of the Tennessee Coal, Iron & Railroad Co., Ensley, Ala. These stoves are 21 feet in diameter x 100 feet high, and of the most modern design. The installation just completed makes a total of 20 McClure stoves at the Ensley plant, which have been erected during the past several years.

The borough of Ellwood City, Pa., has taken bids for additional equipment for its power plant. One 150-horsepower gas engine and one 100-kilowatt, two-phase, alternating-current generator will be installed. W. C. McElroy is borough clerk.

The Sharon Steel Hoop Co., Sharon, Pa., is installing a 14-inch mill in its works. At present the company has a 12-inch mill on which it breaks down from 3½-inch square to 1½-inch square. The new mill will be set tandem to the 12-inch mill so as to fa-

cilitate the handling of material through the latter.

At the annual meeting of the Pittsburg Emery Wheel Co., held Jan. 14, the present officers were re-elected for the ensuing year. The company completed and put in operation during the year its new plant at Rochester, Pa.

The International Harvester Co. has closed for an additional 21-inch cold mill to be installed in its Chicago works. The United Engineering & Foundry Co., Pittsburg, has been awarded the contract for furnishing the mill.

NEW YORK.

Business Confined to Small Orders—Large Panama Contract.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., Jan. 19.

The local machinery trade continues to run along in a quiet, featureless manner, perhaps with slightly less activity than that prevailing during the first few days of the new year. Practically the only business that is being closed is in isolated machines, for there is very little current in the way of equipping new shops and replacement work is limited owing to the continuance of curtailed operations. It seems that the makers of automobiles have covered most of their requirements for the year, and selling in that direction has dropped off accordingly. Machinery manufacturers and dealers are not expecting much in the early future from the railroads, but there have been some encouraging developments, among them the fact that the Erie has again taken up the matter of closing on a scattered lot of tools, tenders on which were solicited during November. The Carolina, Clinchfield & Ohio has prepared new specifications on the equipment for its general shops, in which the item of machine tools will probably aggregate $25,000 to $30,000, and something definite is expected in this direction. Of course, the Scranton shop requirements will run into a large figure, but it is not expected that these purchases will be made in the early future. Trade in general machine tools of the smaller sizes is reported slightly better.

The U. S. Metal Refining Co., 42 Broadway, New York City, is in the market for 100 steel platform industrial cars of a special type to be built to the company's own specification, for use at its plant at Chrome, N. J. They are to be equipped with bearings made by the Hyatt Roller Bearing Co. A good demand is noted in industrial cars, both for domestic and foreign account. The American Smelters Securities Co., 165 Broadway, has contracted with the Atlas Car & Mfg. Co., for 30 mine dump cars of 16-foot capacity.

Dodge & Day, engineers at 608 Chestnut stret, Philadelphia, have been engaged to inspect shipments and do the erecting and testing work in connection with the installation of cableways for handling concrete at the Gatun locks and dam in the canal zone. This is the contract, involving some $300,000, secured by the Lidgerwood Mfg. Co., of New York City, and calls for six duplex cableways and one single cableway about 850 feet span each. These are designed to handle materials from the barges to piles and from the concrete mixers to place. All of the hoists are to be electrically operated and remote control is to be installed. Frank B. Maltby, chief engineer for Dodge & Day, is now at Gatun in charge of the work.

The H. E. Mills Mfg. Co., Syracuse, N. Y., has completed plans for a brick factory building, 100 x 200 feet, to be devoted to the manufacture of core compounds, and work is to be started in the early future. This will supplement the output of the company's other plants at Cleveland and Milwaukee and will replace the plant destroyed by fire in October, 1907. H. E. Mills is president; Thomas Wheatley, vice president; M. A. Rausch, treasurer, and Frank S. Scoville, secretary.

The Ridgway Dynamo & Engine Co., Ridgeway, Pa., has closed a contract through its New York agents, the Spooner-Mathewson Co., 90 West street, for supplying a 110 K. V. A. alternator direct-connected to a compound engine to the Copper Queen Consolidated Mining Co., Bisbee, Ariz. This is a Phelps, Dodge & Co. property.

The A. P. Smith Mfg. Co., Newark, N. J., is to erect an extensive plant for the manufacture of tapping machines, valves and general supplies for water works. The plans call for a reinforced concrete main building 50 x 215 feet, a pattern storage building, power house, a large machine shop and a building for casting, cleaning and storage purposes.

Bids are being taken on a small brass foundry for Mitchell & Van Meter, Pottstown, Pa., on plans prepared by J. V. Poley, Royersford, Pa.

The Union Metallic Cartridge Co., Bridgeport, Conn., has asked for bids on a 10-story factory building to cost about $150,000. This will be utilized for the manufacture of shot.

NEW OFFICERS CHOSEN

Under Reorganization of New York State Steel Co.

The New York State Steel Co., having a plant at the intersection of Abbott road and Buffalo river, Buffalo, N. Y., has been reorganized, according to an official announcement made by the company. The new officers are: President, N. Beegle, of Beaver Falls, Pa.; vice president, Frederick Davidson, of Pittsburg; secretary and treasurer, Louis R. Davidson, of Beaver Falls, Pa. The board of directors consists of these three officers and Spencer Kellogg, John D. Larkin and Seymour H. Knox, of Buffalo, and George Davidson, of New Brighton, Pa.

It is notable that the new directors are all men of long experience in the steel producing industry, being connected with the Union Drawn Steel Co., of Beaver Falls, Pa., and also owners of the new plant at Hamilton, Ont., which is operated under the same name, and organized to provide for the wants of the trade in Canada. They also control the D. R. Davidson Coal & Coke Co., which was recently organized for the purpose of developing 3,000 acres of land on the Monongahela river, and iron mines in Minnesota. The directors announce that the blast furnace construction at the plant will be hastened to completion and it is expected that the whole plant will be in operation within a few months from this time.

The New York State Steel Co. was organized by Buffalo interests about three years ago to engage in the manufacture of billets, blooms and slabs. The plant is well equipped and it is believed that it will prove to be an important factor in the steel industry of the Buffalo district.

Slag Paving Blocks.—Recent efforts to introduce into this country on a commercial scale the manufacture of paving blocks from blast furnace slag seem to have come to nothing for the present. The New York contracting firm which was in the market for about 1,500,000 blocks for work in that city has made the purchase from a British producer on fairly favorable terms. However, considerable interest was manifested in the project by blast furnace interests in this country and it is not unlikely that further efforts may be made to establish such an industry, particularly as New York city authorities intend to continue the specification of this paving material.

THE CONVENTION OF MANNING, MAXWELL & MOORE, INC.

Nearly 70 men were in attendance at the annual convention of the officers, department managers, branch managers and salesmen of Manning, Maxwell & Moore, Inc., which was held at the Hotel Astor, New York, Jan. 8 and 9. Representatives from foreign countries enlivened the sessions with accounts of the progress made in distant lands, while branch managers and salesmen of Chicago, Pittsburg, St. Louis, Cleveland, Syracuse, Detroit, Philadelphia, Atlanta and Boston offices gave, through their reports, some idea of the vast business done by this corporation throughout the United States—in spite of the depression generally experienced this last year by concerns in the supply business. The manufacturing end was represented by the works managers of the following subsidiary companies: Shaw Electric Crane Co., Muskegon, Mich.; Ashcroft Mfg. Co., and Consolidated Safety Valve Co., Bridgeport, Conn.; Hancock Inspirator Co., and Hayden & Derby Mfg. Co., Boston, Mass.

C. A. Moore, president of Manning, Maxwell & Moore, Inc., opened the convention. At the three meetings, held Friday morning, afternoon, and Saturday morning, various questions were discussed which enter into the manufacture and sale of goods. Suggestions were offered by the heads of the different departments with a view to further improving their well systematized organization. Departmental policy was discussed in connection with its relation to the corporation's policy, the latter being comprehensively outlined by President Moore.

Luncheon was served in the "yacht room" of the Hotel Astor, Friday noon, and on Friday evening a banquet was held in the "college room," J. N. Derby, vice president of the corporation, presiding. This was purely a social event, the evening being enlivened by a Neapolitan orchestra, speech-making and other entertainment.

BANQUET OF MANNING, MAXWELL & MOORE FORCES.

Some Notable Exhibits.—In connection with the convention of the National Cement Users' Association held in Cleveland Jan. 11 to 16, an exhibit was held at Central Armory, and was participated in by many manufacturers. The exhibit indicated the wonderful progress made by the cement industry during the past few years. The American Steel & Wire Co. displayed its triangle mesh concrete reinforcement, and distributed pamphlets elaborately illustrating the use of the mesh. The Universal Portland Cement Co. exhibited its products and distributed a pamphlet on Portland cement sidewalk construction by C. W. Boynton, giving valuable information as to the methods of laying sidewalks. An exhibit which attracted much attention was of small steel centers on large sewerage construction, by the Blaw Collapsible Steel Centering Co., Pittsburg. The Chase Foundry & Mfg. Co., manufacturer of industrial cars, had a track laid and cars in operation. The Insley Mfg. Co., Indianapolis, displayed center dump buckets. Extensive displays were made by manufacturers engaged in the cement business itself.

The Hallidie Machinery Co., Seattle, is installing at Mullan, Idaho, a large Franklin air compressor driven by a Pelton water wheel and running four rock drills.

THE MAHONING VALLEY AS AN IRON CENTER

ORIGINALITY IN PRACTICE MARKED STEADY PROGRESS

Discovery of Native Ores. Limestone and Block Coal Laid Foundations — Exhaustion of Local Deposits Did Not Check Growth—Rolling Mill Development From Earliest Days

By Joseph F. Froggett.

Logical and yet characteristic were the rise and general progress of the manufacture of iron and steel in the Mahoning valley. Logical, because there were found and used in the earliest pioneer days precipitous creeks that furnished water power; ore with an iron content as high as 50 per cent; limestone and fuel, both wood for charcoal and a bituminous coal of such a nature as not to require coking to fit it for smelting purposes. Characteristic, because, despite not being situated upon a navigable or other great natural highway, its development became possible only through the pluck, initiative and foresight of the pioneer iron masters in overcoming distributing disadvantages. Today—its ore and fuel potentialities long since exhausted, and even its water supply for future manufacturing purposes possible only through impounding within naturally high banked neighboring creeks—its thoroughly organized distribution system and highly skilled labor, supplemented by the most modern plant equipment, operate to preserve it from the decay into which other like and formerly prosperous manufacturing communities have fallen.

Little was left to chance, solely excepting the original discoveries of raw material; pioneers in both practice and construction were alert to take instant advantage of every exigency of trade demand or recession. In cycles so characteristic of the iron business, alternately rising under the fostering care of a protective tariff law and the encouragement of country-wide prosperity, and again falling when blasted by pioneer "tariff reform" and blighted by financial panic, the general tendency was upward and onward. Precarious from the viewpoint of financial returns, fortunes being won and as often lost, the ever varying art of manufacture obeyed the demand for improved machinery and practice, entailing the consequent abandonment of old and once successful plants and processes.

The Mahoning valley, strictly, is a narrow strip of land in northeastern Ohio through which flows the Mahoning river. It terminates roughly on the north at Warren, Trumbull county, and on the south at Lowellville, the last town in Mahoning county before crossing the state line into Pennsylvania. Youngstown, the largest city in the valley and nominally its center, is situated nearer the southern boundary and about eight miles from the state line. The valley lies along the southern border of the historic "Western Reserve," that section of the old Northwest Territory

Gov. David Tod.

which was ceded to the state of Connecticut by the then recently formed United States government in payment to the New England state of debts arising out of the prosecution of the War of the Revolution. Thus the revolution led indirectly to the settlement of this section, while yet inhabited by wandering Indian tribes, by entire colonies of shrewd and enterprising Yankees from Connecticut and eastern New York. To these early settlers was due the discovery of iron ore and fluxing limestone in the wooded hills, the establishment of the first blast furnaces and the initial impulse to manufacture in what seemed to have been determined a farming and trading community. Descendants of these pioneer iron masters have brought this portion of Ohio to its present position in manufacturing America.

Chief among the men to whom the Mahoning valley acknowledges an everlasting debt of gratitude for the insurance of its future were Gov. David Tod, pioneer in development of coal resources as well as water and railroad transportation facilities; James Ward, pioneer rolling mill projector at Niles, O.; John Stambaugh, upon whose shoulders largely fell the mantle of Governor Tod; Richard and Joseph H. Brown, William Bonnell, Chauncey H. Andrews, William J. Hitchcock, Thomas H. Wells, and a host of contemporaries, each of whom contributed something toward the general upbuilding.

Not the least important factors because rarely in that day in the public eye were the pioneer bankers who made possible financially the development of manufacture. Judge William Rayen, first president of the Mahoning County National Bank, now the First National Bank of Youngstown, and his successors, Dr. Henry Manning, William S. Parmelee and Robert McCurdy, all now deceased; Hugh B. and Paul Wick, of Wick Bros. banking house, and the sole surviving partner, John C. Wick, of Youngstown, were men of courage and foresight. As has been well said, "they risked their individual fortunes with their customers' savings" in financing the hazardous pioneer efforts of iron manufacture and bore the financial burdens of little else than a frontier community through its many trying periods. In their day, the stock market was taboo; mere mention in their banking houses of "speculation" as represented today by the "ticker" was the signal for anathema if not the instant severing of banking relations. Soundness and

conservatism were their characteristics and the terrifying crash of but few broken banks ever resounded through the Mahoning valley.

The earlier operating men have largely disappeared from the iron and steel business, and many of them are deceased. Their influence upon the development of the valley's industries can hardly be overestimated. And it is proper to say, as may be inferred from the historical record here presented, that their influence was always exerted in the way of betterment, development and growth.

I. PIONEER PERIOD.

Early Blast Furnaces.

In 1808, or ten years after settlement of the hamlet of Youngstown, the first blast furnace in the Mahoning valley, in the Western Reserve and in Ohio was built at the mouth of Yellow creek, a point not far distant from where the present modern stack of the Struthers Furnace Co. now stands. It was constructed and run by Messrs. Clendennin, Montgomery and Mackey, early residents of Youngstown. Iron for any purpose was truly a precious metal to those pioneers, having to be transported from Pittsburg mostly on the backs of pack animals; and when to the sharp eyes of these shrewd prospectors from the manufacturing east were disclosed in the creek bottom in the shape of "kidney ore," the evidences of larger stores in the hills further back, they realized its importance. Their furnace was a crude stone stack 30 feet high and 8 feet across the bosh, open at the top, and afterward known as a "pocket furnace." As was the case with all the early furnaces in that locality, it had no hoisting house, but was built against the hillside, being charged by means of a bridge thrown from the top of the bluff to the top of the stack. Charcoal was burned in the woods at hand and abundance of limestone was found in the outcropping along the creek banks. Driven by the waters of the creek, a cold, damp blast was blown through a single tuyere into the stack. Its production was one and one-half to two tons of cast iron a day. This was molded into kettles, andirons, hearth baking ovens, etc., which were sold and used in the immediate locality.

More workable iron than cast metal was early in demand. So, in 1809, James Heaton built a refining forge on Mosquito creek, near the site of the present city of Niles, Trumbull county, where he hammered out of Yellow creek pig iron the first bars made in Ohio. In 1812, Heaton built a charcoal furnace at Niles, but the war with Great Britain broke out and almost all available men in the locality left to join the American army. In 1813, Daniel and James Eaton, brothers, whose name was changed from Heaton by act of the Ohio legislature, bought the Yellow creek furnace, and later built another farther up the creek where its remains were recently disclosed and preserved by the Mahoning Water Co., while building its mammoth dam, recently described in THE IRON TRADE REVIEW.

The third creek in the valley to be reached in succession by the blast furnace development was Mill creek, two miles west of the then village of Youngstown, but now included in its present beautiful natural park. In 1826 a charcoal stack was thrown against the hill at whose foot now stands the Pioneer pavilion and about a mile and a half above the mouth of the creek. The stone building refitted a few years ago by the park commissioners into the present pavilion was the storehouse of the original furnace company. Kidney ore picked up at first from the creek bottom was smelted with charcoal then burned at hand, the water of the creek supplying the power to drive the cold blast into the stack. Its output was about two tons of iron a day. Among the first founders were the Eatons—James, Daniel and Isaac. The last owner of the stack was James Redmond, probably about 1846, who through the unprofitable working of the furnace lost both his money and his reason. When the sheriff tried to levy upon the stock of iron, he found it had disappeared. Some years ago, the park commissioners in grading roads uncovered pits in which the small pigs of iron had been buried many years before. It proved to be a soft, fine iron, much like Swedish iron.

Tod Develops Coal Fields.

However, the knell to these primitive methods of iron making had been rung. Bituminous coal had been known for some years to exist at various points throughout northern Ohio. The first outcropping was developed in 1810 at Talmadge, Summit county, the product being used locally by blacksmiths. As the forests were cleared away, coal gradually came into general domestic use.

But it remained for David Tod, then a young lawyer and afterward war governor of Ohio, to make the first tangible move toward developing this distinctively valley resource. In 1840 he was mining the finest block coal in Brier Hill, near Youngstown when, upon the completion the latter part of that year of the Ohio & Pennsylvania canal from Akron, O., to Beaver, Pa., he shipped several canal boats of his block coal to Cleveland to be introduced as fuel on lake steamers. Engineers and firemen were alike hostile to the new fuel, but Tod was persistent and resourceful and by 1845 wood had been supplanted as fuel on the great lakes.

REMAINS OF OLD CHARCOAL STACK.

It was the second stone furnace to be built on Yellow creek, near Struthers, O.

In 1845, a blast furnace was under construction at Lowellville, O., by Wilkinson, Wilkes & Co., which was destined to be the first stack in the valley blown in and run on raw coal. It was built into an iron stack in 1872 by the Ohio Iron & Steel Co. and renamed the Mary. The original builder had planned to use for fuel bituminous coal taken from seam No. 1, common both in Youngstown and Sharon, Pa., districts, and known as "free burning splint" or "block coal," in the company's own mine near Lowellville. In July of that year, through a strike among their coke plant hands, Himrod & Vincent, then running the Henry Clay stack, near Sharon, Pa., were compelled to use this raw block coal for fuel. Controversy ensued for years between the partisans of these furnace companies as to which belongs the honor of first using raw coal in smelting iron in the Mahoning and Shenango valleys. But honors appear to be even; to the Lowellville stack as the first to blow in and run on raw bituminous coal; to the Sharon stack as the first to use raw coal for fuel. The Ohio Iron & Steel Co., which has operated the Mary furnace for many years, was incorporated in 1879, the original stockholders being Thomas H. Wells, Paul Wick, John C. Wick, Myron C. Wick, Henry Wick and Robert Bentley. Mr. Wells was president of the company for a quarter of a century and upon his death Mr. Bentley was chosen president, having been both secretary and general manager since the formation of the company. F. H. Wick is treasurer and David Davis secretary.

The coal found in this locality was peculiarly dry bituminous mineral, unlike Pittsburg coal, which because of its tarry nature could not be used for furnace fuel until coked. Such was the excellence of this coal that to this day "Brier Hill block" is the standard for bituminous coal the country over. The native ore was found in extensive pockets in two forms: the "kidney ore," so called because of the shape of the pieces found along every creek bottom, the center of each being a stone about which the iron material had been deposited and running from 40 to even 50 per cent iron; and the "blackband" or carboniferous ore assaying 25 per cent and not exceeding 30 per cent iron found in largest quantities near Wampum, Lawrence county, Pa., Columbiana county, O., and near Mineral Ridge, Trumbull county, O. The later practice in the use of "blackband" ores was to roast them in huge fires in the furnace yards just previous to filling them into the stacks. These ores continued to be smelted until the richer Michigan hematite deposits were developed at the conclusion of the war of 1861-65. Blackband ore continued to be worked by Haselton, Thomas, Himrod and Hubbard stacks until about 1880, the Eagle stack using in addition Lake Champlain, N. Y., ore until the stack itself was abandoned in 1878.

The pioneer rolling mill of the Mahoning valley was built at Niles, O., in 1841, by James Ward, who came from England in the latter thirties and settled in Niles. This mill was later known as the "old Ward mill" and was operated successfully with the materials and machinery of that day. The operation of these mills made Mr. Ward one of the more notable of the iron manufacturers of his time. He died in 1861 and was succeeded in the management of the mill properties by his son, James Ward, who built the Russia mill in 1864 and the Falcon mill in 1867. These mills were operated by James Ward & Co. until financial difficulties were entailed by the panic of 1873. About two years afterward the company was reorganized under the firm name of L. B. Ward & Co., which operated the mills until 1880 when it was compelled to suspend and the properties passed into other hands.

Following the building of the Wilkinson, Wilkes & Co.'s stack at Lowellville, in 1845, two furnaces were built in the following year at Brier Hill; the Brier Hill stack by James Wood & Co. of Pittsburg, and the Eagle stack by William Philpot & Co., the latter having a daily capacity of 28 tons. Of far reaching importance was the construction in 1846 of the Youngstown Iron Works by Fuller & Dangerfield with money furnished by the Wick family, the nucleus of what afterward became the Brown-Bonnell plant. The distinguishing feature of this mill was its refining process. Pig iron piled with charcoal upon an open hearth was reduced by an air blast from beneath, the blooms so made being hammered out.

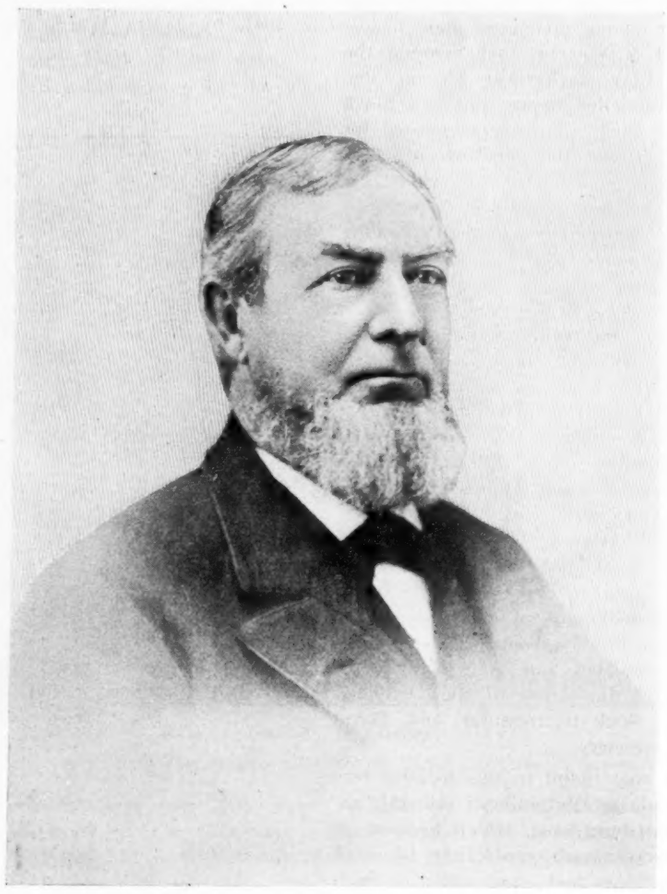
RICHARD BROWN.

Results of Free Trade.

"Tariff reform" was in the air, however, and James K. Polk was chosen to the presidency. Robert J. Walker, his secretary of the treasury, introduced in congress the administration's views on low tariff as distinguished from Henry Clay's protective tariff

principles and the Walker low tariff bill became a law. Its effect in the Mahoning valley was almost immediate, for the Youngstown Iron Works closed down in 1846 and as such never opened again. The mill was abandoned, the buildings themselves actually and literally being used for the next nine years as cowsheds. Before they were again used, the art of "puddling" or refining iron by the so called "boiling" process had been introduced from England and the oldtime "bloomaries" passed out of the valley's history.

The first resumption of operations after the disastrous Walker bill had worked its evil took place in 1854, when Lemuel Crawford and Charles Howard built and blew in the Falcon furnace on a site east of the then idle plant of the Youngstown Iron Works. This stack had a daily capacity of 50 tons of pig iron. The partners disagreed and in 1856 Howard built the Phoenix stack west of the Falcon with a daily capacity of 40 tons. The Falcon furnace from its start, by reason of its numerous departures from all precedent in furnace construction, became the banner stack of the United States at that time. People interested in the iron business came from all parts of the country and some even from Europe to see and copy it in whole or in part. It was in this furnace, in 1856, that the first Lake Superior ore brought to the Mahoning valley was smelted. After Mr. Howard's departure from Youngstown in 1858, the furnace was operated by non-resident firms, Paul Jones, who as a lad of 18 years had entered Howard's employ as bookkeeper in 1856, continuing to act in a managerial capacity until 1865, when it with the Phoenix stack had passed into the hands of Brown & Bonnell. In these stacks survived for many years the then only known method of available hoisting adopted when the primitive method of construction of a stack against the hillside was abandoned. The improved method consisted in running the hoists by gravity. Iron tanks were fitted underneath the floors of the cages. The topfiller filled the tank of the empty cage at the top of the furnace with water from a tank and at the proper signal from below, loosened the friction brake on the rope drum. The unoccupied cage would sink with its heavy load of water, which overbalanced the cage on the other side loaded with barrows of fuel, stone or ore. When the waterloaded cage reached the bottom, a valve on the underside touched a stopper and thus discharged automatically. These stacks were each fitted with three tuyeres, originally known as "mud tuyeres." The nose of the tuyere, daubed with mud, was thrust directly into the interior of the stack and the air blast thus introduced without the precaution of water coolers. Of course they burned out rapidly even for that day. William Richards, father of Manager S. A. Richards of the Struthers Furnace Co.'s stack for years, and afterward more closely identified with iron manufacture, invented the first tuyere used in the valley with a water jacket and for some time thereafter fitted up local stacks with his invention and repaired and replaced the burned out tuyeres.



JOSEPH H. BROWN.

Founding of Brown & Bonnell.

In 1855 occurred an event which had an important bearing upon the development of the iron industry in the valley. This was the taking over of the Youngstown Iron Works by Richard and Joseph H. Brown, brothers, and William Bonnell, from New Castle, Pa. Mr. Bonnell was the father of Henry O. and W. Scott Bonnell, both afterward actively identified with valley iron manufacture. The mill, which became known afterward as No. 1 mill, stood on the north bank of the canal and included four puddling furnaces, two heating furnaces, one annealing furnace, eight nail-cutting machines, one muck train, a nail plate mill and a 12-inch bar mill train. An old engine which had once done duty on a river steamboat furnished the power. The plant's daily output of finished material was seven tons, operation being limited to daylight. Another limitation imposed by nature confined the mill's operating to only the summer months, the canal which furnished the only means of transportation of fuel, ore, etc., in bulk, being frozen up in the winter. Bar iron sold at this time for about $67 a ton. Puddlers were paid $4 to $4.50 a ton, and bar mill heaters and rollers 75 cents a ton. Joseph H. Brown managed the sales, William Bonnell the office affairs and Richard Brown the mill, himself a practical roller.

Not content with having opened up an avenue for the shipment of val-

ley coal and iron to Cleveland and the Ohio river by means of the Ohio & Pennsylvania canal, of which he was one of the most ardent advocates and a director in the company, David Tod, in 1856, saw opened and in operation another transportation project which had much influences upon the valley's development. This was the Cleveland & Mahoning Valley railroad, now a part of the Erie system. Tod was one of the most active promoters and managers of the railroad, being a director and afterward president in succession to Jacob Perkins upon the latter's death. Tod bolstered up the early financial status of the road at the peril of personal financial embarrassment, but lived to see the success which he had so justly merited, his greatly regretted and untimely death coming in 1868. He left worthy successors in his sons, John, Henry, George and William (all now deceased), who actively promoted the valley's industries all their lives.

Beginning with 1859-60, came an era of blast furnace building. In the years just mentioned, the Himrod Furnace Co., a New York corporation, erected two stacks along Crab creek in the eastern part of the town. The officers of the company were: President, W. A. Wright; vice president, Robert Kelly, New York; treasurer and general manager, A. B. Cornell. Still another Himrod stack was built in 1868, and statistics for 1874 show that the combined output of all stacks was between 75 and 80 tons daily. The third stack was dismantled in 1887 and the other two abandoned in 1893. S. Frank Eagle had run this plant for a time a short while previsou to final abandonment. In 1860, Jonathan Warner built and blew in the Porter stack at Austintown, running with Mineral Ridge coal and native ore. Mr. Warner, when well up in years, was one of the first Mahoning valley prospectors in the newly discovered Michigan ore regions. The Porter stack was abandoned in 1873.

In 1860 the Brier Hill Iron & Coal Co., which had been formed by David Tod, built the Grace stack. The next year the company of which

WILLIAM BONNELL.

John Stambaugh became president in succession to Governor Tod, Nelson Crandall, secretary, and J. G. Butler Jr., manager, took over the Brier Hill furnace built years previously by Wood & Co., and also built Tod stack No. 2. Thus early did "combinations," as they are commonly denominated these days, begin in the Mahoning valley. Later, or in 1888, Henry H. Stambaugh, son of John Stambaugh, became secretary and remained in the employ ever since, now being treasurer, while R. C. Steese is secretary.

Until about this period the usual blast furnace practice had been to run with "open top," gases passing unhindered out of the top of the stack except what little could be caught in "pocket flues" built into the stack lining for use with coal under the boilers. A textbook on the then modern practice in England was received about this time by Joseph H. Brown, who placed it in the hands of Job Froggett, for a quarter century manager of the blast furnace department of Brown & Bonnell, with the injunction to try on the Phoenix stack the "bell and hopper" method there outlined. The bell and hopper were cast in the little foundry of Homer Hamilton, founder of the present engine building plant of the William Tod Co. Mr. Brown was anxious to have the installation made at once, but Mr. Froggett demurred until he could see a like installation which was being made for the first time at one of the Pittsburg stacks of Jones & Laughlin. A hurried visit between trains to the top of the Pittsburg furnace confirmed his original ideas of the method and the next day the remodeling of the top of the Phoenix was concluded and the stack blown in at once. The regular top fillers refused to work and the bottom fillers and keeper deserted the stock and casting houses, declaring that the stack would explode when closed. A few adventurous employes assisted the manager in running the furnace for the greater part of the day until the more timid could be reassured that no explosion was liable. Several valley stacks continued to run with open tops for some years afterward.

(To be continued next week.)

MAKING NEW PLANS

For Lake Superior Corporation's Plants Following Transfer of Control.

Toronto, Canada, Jan. 14.—The new year has opened auspiciously for the iron and steel industry, several important expansions having been undertaken. The most considerable is that following the reorganization of the Lake Superior Corporation and the investment of $6,000,000 of British capital in the allied industries of Sault Ste. Marie. The new interests are represented by Robert Fleming, of Edinborough and London, and Dr. F. S. Pearson, of London and New York. It is understood that the general direction of the affairs of the corporation will be intrusted to Dr. Pearson, who is prominent in connection with several Canadian industrial enterprises, being a director of the Dominion Iron & Steel Co. and the Dominion Coal Co. The plans in contemplation include extensive additions to the blast furnaces and mills and the extension of the Algoma Central railway to connect with the Grand Trunk Pacific. A close investigation of the condition and possibilities of the company will be made by Dr. Pearson before the course to be pursued is finally determined. The last installment of the loan of $2,000,000, guaranteed by the Ontario government in 1904, of which $1,000,000 remained due, was repaid on Jan. 13, and the guarantee canceled.

The Collingwood Ship Building Co. of Collingwood, Ont., will considerably enlarge its plant, having purchased an additional water front lot of 10 acres from the town. The enlargements will include two new dry docks, one 400 and the other 705 feet in length, with the necessary equipments. The first of these is well under way and is expected to be ready for operation early in the season. There are about 20 steamers waiting to go into the dry dock for repairs. The keel is being laid for another new steamer for the Northern Navigation Co.

PRODUCTION OF MALLEABLE CASTINGS—X

The Use of Producer Gas as Fuel for the Open-Hearth Furnace for Melting Iron for Malleable Work

By Richard Moldenke

As has been previously stated, the operation of the open-hearth furnace, which should not be larger than 20 tons for good practice, is dependent upon the use of gas a a fuel. Whatever material is to be burned, it must first be gasified in some manner. The earliest attempts in this line were made by Siemens, and the gas known by his name is today still the best for metallurgical purposes, though no longer made on account of its rather high cost. Still, the composition—half carbonic oxide, and half nitrogen—makes it more valuable than the gases with low carbonic oxide, and high hydrogen, for the purposes of practical steel and iron making.

With the introduction of the steam jet for blowing air into a gas-producer, and at the same time holding down the temperature within reasonable limits, there came a new era for the open-hearth furnace. Enormous quantities of coal could now be turned into gas in comparatively small producers, and if close attention were given the installation, very uniform results would obtain.

Early Experience with Producers.

The author had one of the earliest American producer plants in his care, and hence went through a lot of the kind of experimenting which is usually so costly, but of great benefit to those who follow. In the discussion of the subject, therefore, a number of points will be brought out which have the merit of being gotten by some years of very strenuous life. The plant consisted of 14 producers of an early type, which would convert four car loads of good Pittsburg gas coal into producer gas every 24 hours. These producers were all connected to a system of underground flues which delivered the gas to the melting and annealing furnaces of the plant. The gas for the open-hearth furnaces entered a steel box provided with a safety door in case of explosions, before entering the regulation furnace gas valve. For the annealing ovens a special gas box was constructed, after much experimenting, in which gas, and air for burning it, were so handled that most excellent results were obtained. Man holes were placed at regular intervals, as well as stack connections, so that the periodical burning out of the flues, and the consequent removal of soot could be arranged for. As this gas has a very large volume and very low heating value, it becomes a question of pipe, not in inches, but feet diameter, and hence all flues overhead, and connections, were made of riveted sheet steel plate, lined with a grade of fire brick which would withstand about 1,200 degrees Fahr. successfully,

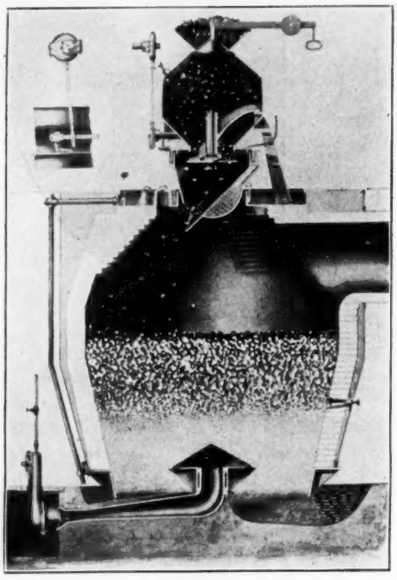


Fig. 1—Sectional View of Morgan Continuous Gas Producer With Automatic Feed

which means a brick a little better than the common red variety.

Underground flues are usually of red brick with a lining of this same flue brick. The disadvantages of any underground work are, however, so great, that as little of this should be done as possible. The expansion and contraction of the flues—usually built like conduits, and often 4 feet wide and 5 feet high—is such that the entrance to connecting flues or branches is partially cut off, and the brick work badly damaged in short order. Furthermore, where such a flue traverses the foundry floor, it is very hot to work upon, and men as well as the sand heaps suffer correspondingly. It is therefore advisable to carry the conduits for the gas overhead as much as possible, preferably on the lower chord of the roof trusses, after these have been strengthened suitably.

Modern Gas Producer.

Fig. 1 gives the section of a modern producer. It consists essentially of a steel shell lined with fire brick of the best quality. On the top of this shell is the floor, water-cooled, so that men may work on it with some degree of comfort. Poke holes are provided on the floor and in the side, for insertion of rods to break down the fire when required. The charging head is placed in the center of the floor, and is arranged with a bell and hopper, so that coal may be placed in it, and allowed to drop, without escape of gas. The illustration shows an automatic device for feeding, which assists materially in making for regularity on the part of the apparatus.

At the lower part of the producer there will be seen the air inlet, the cap of this practically serving as a grate or rather deflector for the fuel. This keeps the air inlet free. Steam is allowed to enter this air inlet, as shown, and in rushing in through a very small orifice, a large volume of air is drawn in, air and steam entering the incandescent fuel in the producer together. A water seal holds in the gas under pressure of a few ounces, and allows a ready means to remove the ashes without in any way disturbing the continuity of the process.

Fuel Bed.

It will be noted that the bed of fuel is very thick. This is necessary, as the chemistry of the process will show. The air entering the bed of incandescent fuel is at once converted to carbonic acid with nitrogen from the original nitrogen and oxygen. As this passes upward the carbonic acid dissolves more carbon and becomes carbonic oxide. This is the real fuel gas. The nitrogen goes up through unchanged, and is the unavoidable and inert diluent of the gas. Now it takes a little time for this extra carbon to completely change the carbonic acid gas to carbonic oxide, and hence, unless the bed is thick

enough, the process may not have been completed when the gas emerges above the surface of the fuel. In the chemical examination of the gas, therefore, if the amount of carbonic acid exceeds 4.5 or 5 per cent, the low point of the process, the bed of fuel has been allowed to get too thin. Further, any lack of uniformity in the fuel bed, such as clinkers, solid masses of fuel, or again large voids through which the gas may pass without coming fully in contact with incandescent carbon, mean uncombined oxygen in the fuel gas, and are due to inattention on the part of the men to their work.

All well regulated works in which producer gas is made, should have an analysis of the gas at least twice in 24 hours, so that the day and the night shift are checked up. The typical gas should be about as follows:

	Per cent.
Carbonic oxide	23.50
Hydrogen	14.00
Oxygen	0.50
Nitrogen	57.50
Carbonic acid	4.50
	100.00

This is obtained by the rapid method which does not go into the refinements of the hydrocarbons present, but gets them practically as hydrogen, etc.

Use of Steam.

The use of the steam jet is, as above stated, not only for drawing in the air, but also for reducing the temperature of the incandescent fuel to a point which will allow a continuous performance. Were air alone to go in, the temperature of the mass would go up so rapidly that the whole apparatus would melt down in a short time. If, on the other hand, steam were allowed to go into the fuel made incandescent by the preliminary stack draft, as steam alone, the whole mass would rapidly cool down, as in the case of making water gas with anthracite. Hence a happy medium, which allows just as much steam as may be necessary to hold the temperature right to enter.

Producer Gas.

Discussing the analysis of the gas further, we note that for practical purposes, the percentage of oxygen and carbonic acid—the deleterious ingredients—are a sufficient guide to observe in order to ascertain whether the producers are handled right. The percentage of hydrogen should be held as low as possible, for while the heat value of this element is the highest in the gas, unfortunately in burning hydrogen an intense local heat is generated and water made as the product of combustion. This water vapor in passing along in the furnace is dissociated and again forms hydrogen and oxygen, with the absorption of much valuable heat. Then the two elements recombine, giving up their heat. and so on until the stack or such a point is reached where the temperature is too low to allow this dissociation of water vapor. The result is a very unsatisfactory condition of affairs, and hence the lower the gas in hydrogen, with a corresponding increase in carbonic oxide, the better the steel and iron founder likes it.

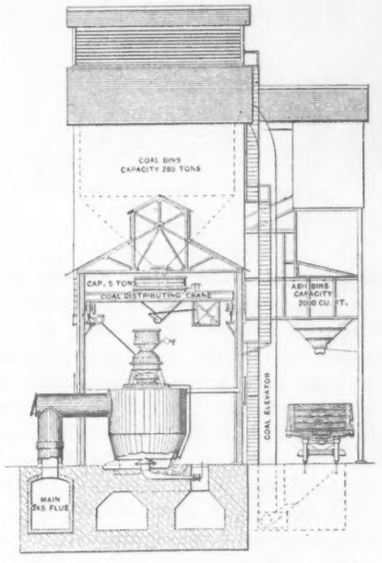


FIG. 2—CROSS SECTION OF MORGAN GAS PRODUCER, SHOWING COAL AND ASH HANDLING EQUIPMENT

As previously stated, the higher the carbonic oxide of the gas, the better. The quicker the hydrogen gets down to 14 per cent and lower, and the sooner the carbonic oxide gets up to 23.50 per cent and higher, the better. It is for this reason that the old Siemen's gas with 50 per cent carbonic oxide and no hydrogen was so well liked, though too slow and expensive in the making.

There is a further point to be observed in watching the gas-producer, and that is the ash. It will be seen in Fig. 1, that from fresh fuel at the top the mass in working downward—while burning out the 88 odd per cent of carbon, moisture, sulphur and volatile matter—it leaves the 10 to 12 per cent of ash. This gradually accumulates at the bottom in the pan filled with water, and is drawn out without allowing air to enter. This ash, if the producer is handled with intelligence, and the plentiful use of muscle at the bars through the poke holes, should be a clean white, and free from practically every trace of carbon. If coke and half consumed coal come through, the regulation of the process has been imperfect, and attention should be given the plant at once.

Hence with an inspection of the ash daily, the taking of analyses, and the other manipulation of the plant, such as burning out the flues, etc. very good metallurgical gas should be made.

Use of Inferior Coal.

It may further be stated that the producer furnishes the means for making use of inferior coal, in regions where good coal is expensive, good gas will result, unless of course, the sulphur content is too high. Still even this gas, when used for power purposes, is excellent, and may be the means of utilizing the enormous bodies of poor coal now left in the mines, when the transmission of power from mine to manufacturing cities becomes the order of the day. The conversion of coal to gas is so simple and at the same time so efficient, that for any given system of firing, whether boiler or furnace, there is an advantage at the very start of at least 10 per cent in favor of gas firing, not to speak of the extra ease in using gas over coal at the point in question.

It is a well understood fact, that in annealing practice, a steady supply of gas, well regulated and burning easily with a minimum of draft, gives far better results than a coal fire which is disturbed periodically and requires an excess of air for combustion of the proper kind.

Producer gas is very low in heating value, perhaps one-tenth of natural gas. Hence immense volumes must be made, and if possible kept at as high a temperature as the producer will make it, without however, running up to a point where an excessive amount of soot is formed by the decomposition of the hydrocarbons present. The plant itself is usually installed with coal and ash handling apparatus, so that the cost of the gas drops down to the minimum. Fig. 2 shows such an installation.

Casting Malleable.

We will now suppose the heat of iron to be ready for pouring off. The slag has been duly skimmed off twice

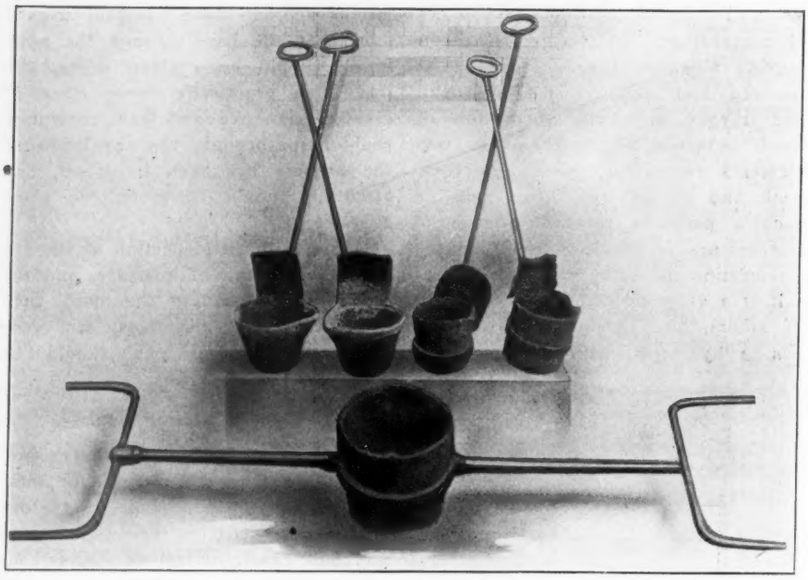


FIG. 3—LADLES USED IN THE MALLEABLE FOUNDRY

or three times, as required, in the air furnace, or not at all in the large 20-ton heats of the open-hearth. Test plugs have shown the metal to be neither "high" nor "low," and the furnace is tapped in the usual way. In practically every foundry it is customary to have the molders line up, and take the metal in their hand ladles in regular rotation. Where the work is rather heavy, as for railroad castings, the shank is used, and up to 300 pounds carried at a time. Fig. 3 shows the ladles and shanks used.

Occasionally two shanks, or one with an extra hand ladle is used, and again for large thin work it may be necessary to have two or three hand ladles emptying metal into one mold at the same instant. The metal, if right in temperature and not burned, is caught white hot, and flaring from minute particles of metal burning in the air. This dies down very quickly, and the metal is readily poured into the molds with a quick turn which practically throws it in.

The author, not satisfied with the danger and confusion which is liable to occur at the tapping spout, especially when a second heat has to be taken from an open-hearth furnace, with the breast in rather bad shape, undertook to tap into six-ton ladles from his three-spout furnaces shown in a previous article. The crane facilities permitted this, and the metal was taken about the shop, over 650 feet, to the point wanted, and the ladle dropped into standards, or left suspended, while the men got the iron in their ladles and shanks the usual way. This cut out all work with the breasts, they were simply broken out, or the upper ones tapped so large that a few minutes sufficed to take off the heat in the furnace down to that level. The melter could attend to his heat while the first and second ladles were poured off, and the breaking out of the lowest breast, with consequent emptying out of the furnace altogether in half a minute, allowed him to patch up bottom and get ready for the next heat.

Tapping.

In tapping each of the three spouts in turn, the following precaution was taken. Owing to the patching up of the bottom, and the consequent change in the content of the furnace for each spout level, while the big ladles held more than six tons each, it often happened that much more than six tons would come out, and hence a second ladle was placed on the floor in front of the suspended ladle at the tapping spout, so that any overflow of metal would be duly caught. This obviated any danger, and the ladles were emptied sufficiently fast to have this surplus metal hot enough to pour in its turn.

Temperature of the Metal.

As to the temperature of the metal thus poured, the following may be said: It became the custom in pouring off the first of the large ladles, to leave some 500 pounds in the bottom, as the temperature got a little too low to pour light or medium work satisfactorily. This 500 pounds left in was taken to the furnace, and the second tap run into it. This second ladle was already so hot—the furnace being under gas all the time—that every drop of it went into whatever work was on the floor. The final ladle, naturally the hottest, was of such a temperature that molds having three brake shoe keys in them, with vent holes at the end, when set slightly tilting, and poured, spouted out three thin streams of metal through these vents.

Of late, there is being introduced in the larger malleable foundries the

FIG. 4—FURNACE FOR REHEATING MALLEABLE CASTINGS

overhead trolley system. This will enable some 500 pounds to be taken to different parts of the shop and cast either direct or into hand ladles.

Handling the Metal.

Perhaps the nicest system of handling metal known was used by the author in his works for a time, though not kept up after his leaving Pittsburg. This was the bottom pour, with a peculiar spout arrangement. It came about through a suggestion of E. H. Mumford, the well known molding machine authority. He sketched out a device in which there was bolted just below the orifice of the bottom-pour ladle, a cupola spout, and this duly lined. When the rod was raised and the metal shot through the orifice, it struck this spout, and ran along it gently into mold or ladle, as desired. Thus a clean iron would be drawn off from the bottom of the ladle without any danger of cutting by reason of the head of metal above. There was no waste, and the ladle was not tilted at all. The author used this device in connection with his large ladles. These were brought by crane to one of several standards in the shop, left there, and the crane allowed to go away on other work. The man in charge then simply pulled the lever and allowed as much iron as was wanted to flow into the hand ladles of the men passing by in turns. In fact almost a steady stream was allowed to run. No waste and no heat radiated out on the men as when the large ladle was tilted. This more than balanced the additional cost of the stoppers and time to get them ready. The slag rising to the top of the ladle formed a crust on it, and effectually kept the metal hot below. The ladle also could be covered if desired. At any rate, the men never got cleaner iron to pour off than at that time.

Shaking Out the Castings.

After the casting is completed, and the molds allowed to cool enough to get the work at least black, the molds are shaken out, gates and defective castings separated from the good work, and this sent to the hard tumbling room. Under no circumstances should the work be shaken out red hot—with one exception as noted further on—as otherwise a casting may crack at some critical place, and thus be lost, or worse still the crack may be so small that it passes inspection, goes through the anneal and is shipped, only to fail in service. Hence attention should be given this point, and in the inspection wherever possible the castings should be struck to see if they ring true.

Reheating Furnace.

Where there is any likelihood of finding the castings cracked when shaking out, as for instance in the case of brake wheels and other work in which there are great casting strains, these are taken out as soon as they have set, and while still red hot. They are quickly placed in a so-called "reheating furnace" which is previously fired up very hot. When fully charged with the day's work of this class, the reheating furnace is closed up and the heat allowed to die out over night. This in a measure anneals the castings, though not in a "malleable" sense, and the work may be now cleaned, inspected and go to the annealing room. Fig. 4 shows such a reheating furnace.

The Columbian Iron Works, Chattanooga, Tenn., was recently organized at a meeting of the stockholders with the election of the following officers: President, J. W. Conway; vice president, George M. Guild; general manager, H. M. Lofton; secretary and treasurer, C. D. Richmond, and they, together with Charles A. Lyerly, C. W. Thomas, of Detroit, and W. E. Mills, compose the board of directors. The company has a capital stock of $125,000. It has purchased the Herron pump company's plant, with its well equipped foundry and machine shop, and has planned to install additional special machinery. The Columbian works will manufacture improved wood-working machinery, special tools for metal working, hydraulic equipment, and besides will do a general foundry and machine business.

STEEL SHEET PILING PERMANENT CUT-OFF WALL AT LOCK AND DAM NO. 1, ON THE MISSISSIPPI RIVER.

In the course of its endeavors to provide slack water navigation on the upper Mississippi river, the United States government has for a year or more been prosecuting the construction of a system of locks and dams which will render possible the navigation of the Mississippi river to Minneapolis. Lock and dam No. 1 are located at Minnehaha station, just below Minneapolis, and the construction of the lock walls was undertaken by the use of the standard wooden sheet piling cofferdam. The soil in the river bottom is composed of sand and gravel filled with fragments of limestone, which prevented the driving of the

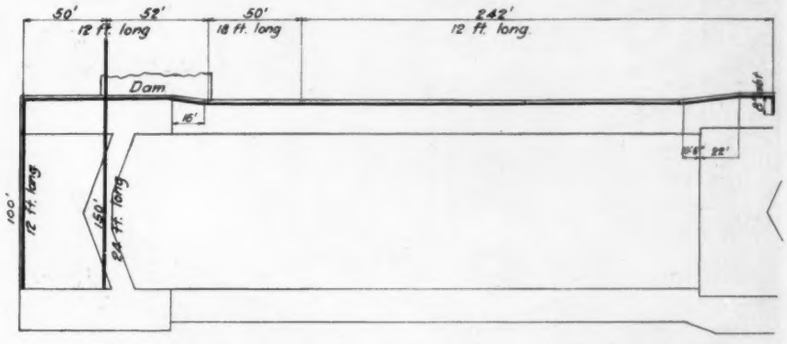


FIG. 1—PLAN OF LOCK AND DAM NO. 1 ON MISSISSIPPI RIVER.

wooden sheet piling to a sufficient depth to provide watertight walls. The current of the river at this point is very swift and the seepage at the upper end of the cofferdam was so heavy that considerable difficulty was encountered in carrying on the work successfully. Several months after the work was undertaken the engineers in charge contended against a heavy inflow of water through the upper side of the cofferdams and finally decided to make an experimental installation of United States steel sheet piling inside the original line of the dam, as shown on the accompanying drawing.

Two lines of piles were driven across the upper end of the cofferdam, one line to a depth of 24 feet and the second to a depth of 12 feet. Connecting with this second section, a lateral installation of piling was driven to lengths ranging from 12 to 18 feet. In all, 617 pieces of 12-inch, 35-pound United States steel sheet piling were driven in lengths of 12, 18 and 24 feet, amounting to 182 tons, by the use of a steam hammer weighing 2,200 pounds and falling 8 feet.

Owing to the character of the subsoil, considerable difficulty was encountered in driving the long lengths of piling through limestone shale. The shorter lengths were driven without difficulty at the rate of 13 to 15 piles per day for the 24-foot lengths and 24 to 34 for the 12 to 18-foot lengths. The cost per lineal foot of penetration was 7.4 cents.

The installation has been completed with entirely satisfactory results and the use of steel sheet piling has obviated the necessity of the adoption of pneumatic caisson construction, which would have materially increased the expense.

FIG. 2—STEEL SHEET PILING IN CORE WALL IN MISSISSIPPI RIVER DAM AND LOCK IMPROVEMENT.

The stockholders of the Sanitary Cream Separator Co., Bluffton, O., have obtained a charter for the Diller Mfg. Co., for the purpose of increasing the capital and securing broader charter power. The Diller Mfg. Co. will continue the Cream Separator company's former line, and will also build a line of air-cooled gas engines designed by Eugene and O. B. Kibele, of Corliss, Wis.

A NEW LINE OF AIR COMPRESSORS.

The accompanying illustrations show features of a new line of air compressors which have recently been placed on the market by the Thos. H. Dallet Co., Philadelphia. These compressors have developed several new ideas in compressor design. All parts requiring adjustment or renewals are readily accessible and a liberal amount of metal has been used where needed to insure rigidity in operation.

The frame is of the open fork center crank type, and is of massive design to permit on each size of compressor, when desired, a greater range of capacity by substituting a cylinder of the next larger size than the standard to operate at 100 pounds pressure. Thus, a 10-inch cylinder may be placed on an 8-inch compressor frame, giving somewhat increased capacity at slightly greater first cost. The line of compressors designed comprise both steam and belt-driven machines of the straight line and duplex types. In the case of duplex compressors with compound steam cylinders, a reducing valve has been inserted between the high pressure steam pipe and the low pressure cylinder, enabling live steam to be fed to the low pressure cylinder for starting purposes, when the high pressure cylinder has stopped on a dead center.

Air and steam cylinders are tied together and held in position, by means of an internally flanged distance piece. On the smaller sizes, this piece supports the air cylinder, but on the larger sizes, the air cylinder is supported on a pedestal, while the tie piece is of circular section without the foot piece. Ample openings are provided to permit adjustment of the stuffing boxes and tightening of the cylinder stud nuts. In the air cylinders, clearance space is reduced to a minimum, and all heads and cylinder walls are water jacketed. Means are provided for draining the cylinder and cylinder head jackets, an essential in cold weather. Lubrication is effected by feeding oil into the intake passage, whence it is carried by the suction into the cylinder in the form of

a spray. Mechanically-operated inlet valves are supplied on all sizes of compressors, when desired. The valves are ground to gage, and the valve holes lapped to size. These compressors are suitable for vacuum service, and are furnished with mechanically-operated inlet valves for high vacuum.

The intake valve is of the automatic poppet type, and is contained in a malleable iron cage, which is in one piece and combines both the seat for the valve and the guide for the valve stem. The cage is threaded and screws into the wall of the air intake chamber only. It seats in a recess of the main cylinder wall, and has thin corrugated copper gaskets to secure a tight joint. The valve cage cap acts as a lock nut for holding the cage in place after it has been screwed down to its seat in the cylinder. In the case of a compound machine, corrugated copper gaskets are placed under the valve cage caps on the high pressure cylinder to insure against any leakage. The valve proper is a hardened special alloy steel, with seat and stem ground to gage. The spring holder comprises a split taper ring set into a recess on the valve stem and held together and tight to the stem by means of a solid taper ring slipping down over it. The hammering of the valve on its seat tends to tighten the spring holder on the stem instead of driving it off. This eliminates any tendency of the spring holder to shear off or work loose from the stem. The discharge valve is of the automatic poppet type, and is contained in a valve cage of malleable iron. The method of seating in its cylinder and locking to its seat is identical with that of the intake valve.

The inter-cooler is of large cooling area, and employs the return flow type of water circulation. Baffle plates are used to deflect the flow of air and aid in its effectual contact with the cooling tubes. This method reduces the air temperature between stages to approximately the original temperature and tends to reduce the final or discharge temperature and also the horsepower required for a given capacity. The nest of cooling tubes may be removed intact from the inter-cooler box without disturbing any of the piping. The inter-cooler is supplied with a pop safety valve pressure gage and drain valve.

The belt-driven machines are provided with an unloading device, which automatically unloads the air cylinder. When a predetermined pressure is reached in the receiver, one or more inlet valves at both ends of the cylinder are held open and the load is taken off of the compressor, allowing it to run light until the pressure drops in the receiver, upon which the valves are released and compression resumed. On the steam machines, a combined speed and pressure governor is used, which unloads the air exactly the same as on a belt-driven machine, and, at the same time, controls the speed, allowing a single steam machine to just turn over when unloaded and bringing a duplex or compound machine to a dead stop.

The steam cylinder and valve gear of the steam-driven machines give a high efficiency with slight attention. A plain balanced D slide valve is used on the small and medium sized machines, while a Meyer balanced adjustable cut-off valve is employed on

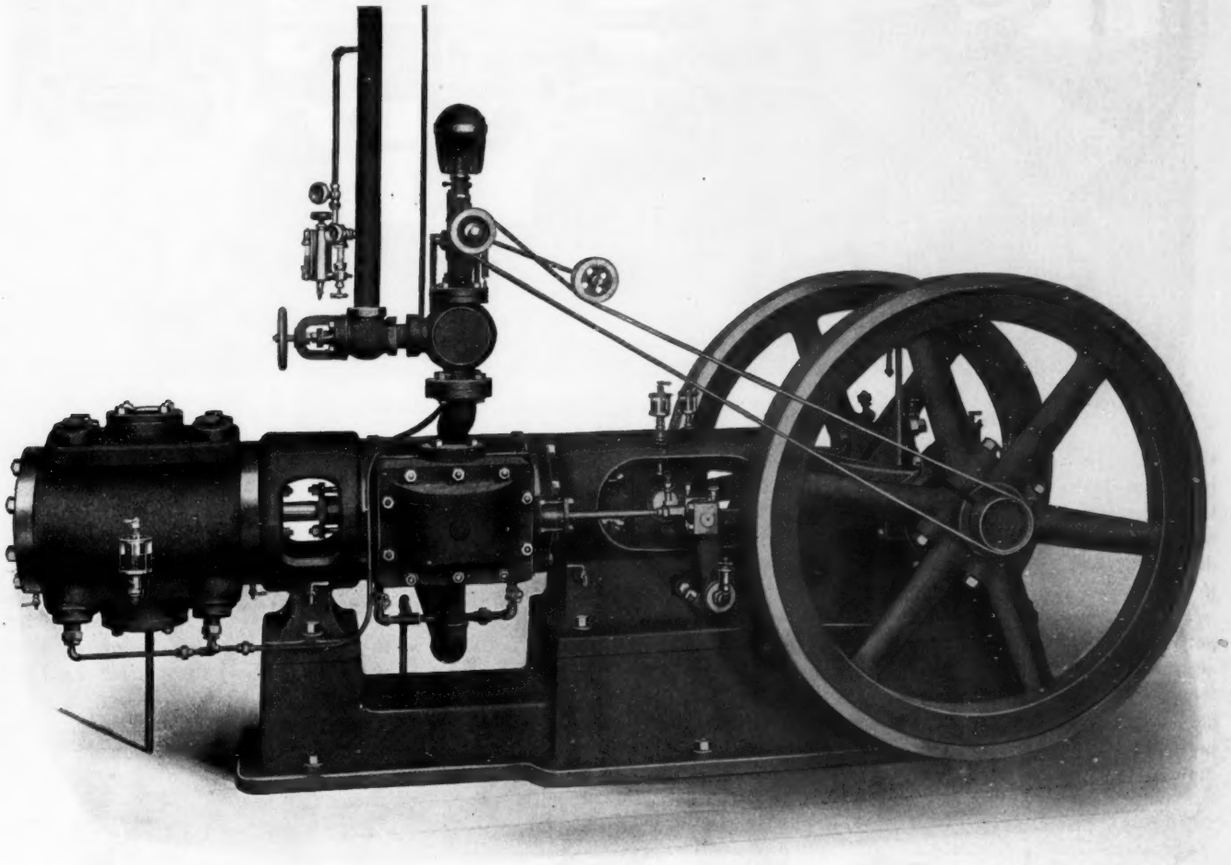


FIG. 1—SINGLE STEAM-DRIVEN COMPRESSOR.

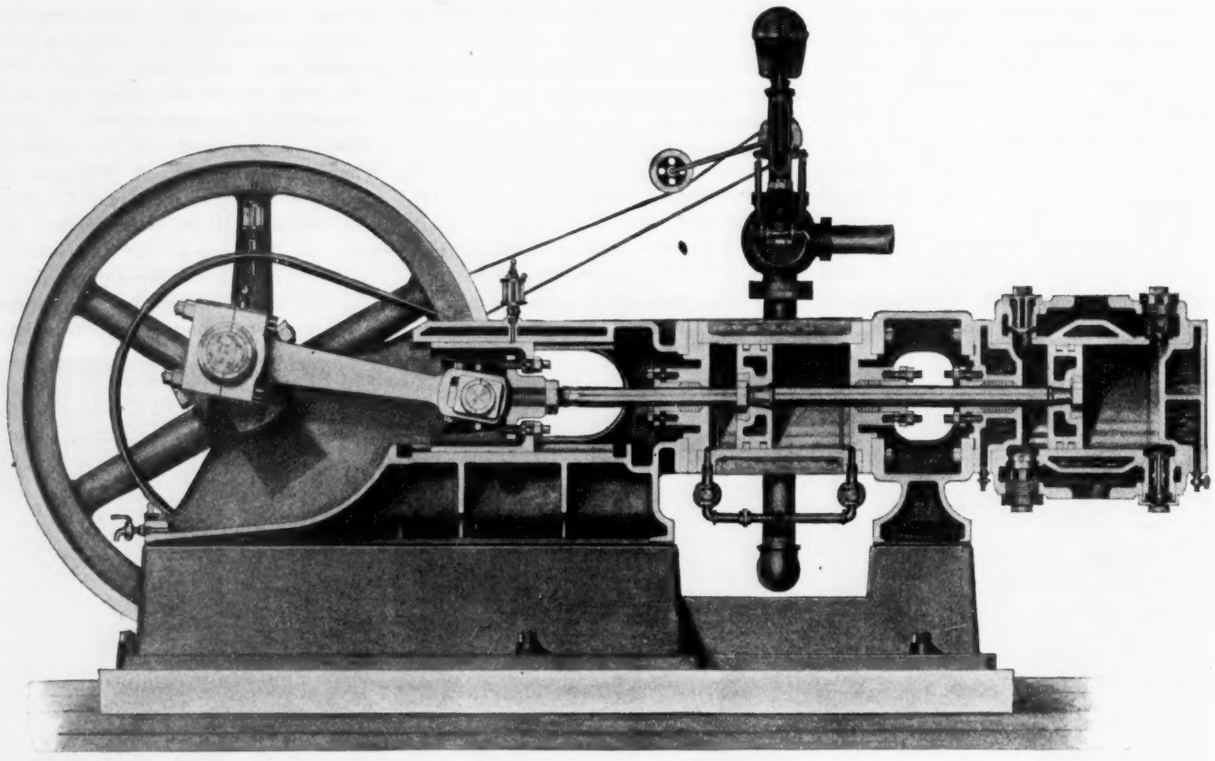


FIG. 2—SECTIONAL ELEVATION OF SINGLE STEAM MACHINE.

the larger machines. The steam cylinders are lagged with mineral wool. On all steam-driven machines the governor is equipped with a safety stop device, which will stop the machine, if the governor belt breaks.

The cross head is a new type box pattern of semi-steel. The shoes are adjustable and have large bearing surfaces. Side bearings allow easy access to the cross head shoe binder bolts. The cross head pin is fitted to tapered seats in the cross head, drawn tight on the tapers by means of a nut held in position by a pin. The connecting rod is of the marine type, and is adjustable at the cross head end by means of a split box. The crank pin end is adjusted by removable tin liners. The crank shaft is forged from a solid billet of open-hearth steel, and in case of a duplex shaft, the portion in the center is enlarged to accommodate the heavy flywheel.

The compressors are built in sizes ranging from 8-inch stroke up to and including 16-inch stroke, and give a range of capacity of 79 cubic feet of free air per minute up to 1,200 cubic feet.

The American Standard Machinery Co., of Muskegon, Mich., which was recently organized with a capital stock of $30,000, by William H. Ashley, of Milwaukee, Wm. H. Moore, and John Hugh Russ, of Muskegon, advises that it will not for the present occupy a building of its own, but will have its product handled at a Muskegon factory for some time. The company will manufacture coat locking devices for hotels and other like specialties.

FIG. 3—PART OF INLET VALVE.

A MOTOR DRIVEN BAND SAW.

The illustrations accompanying show a 36-inch motor-driven band saw recently designed by the West Side Iron Works, Grand Rapids, Mich. The motor is mounted on a bracket cast solid with the frame and is located so that the lower band wheel is mounted directly on the extended armature shaft of the motor. This driving shaft passes through the frame, on which it is supported by suitable bearings. The motor is entirely enclosed to exclude dust. The starting box is conveniently located for the operator so that the control of the saw is easy and removed from danger.

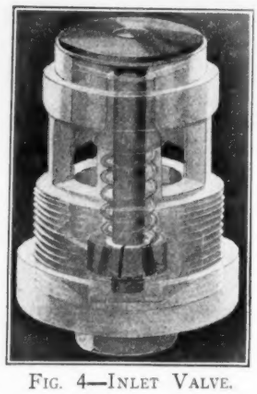
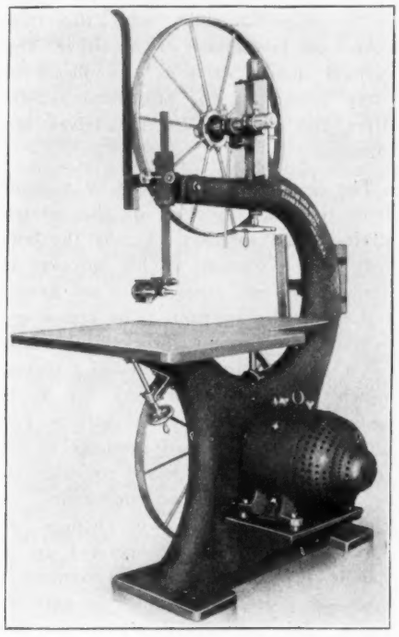


FIG. 4—INLET VALVE.

The design of the tool itself is sim-

ple and substantial. The base is stable and of good proportions. The table is extra heavy and well trussed. It is provided with a screw device by means of which the table may be tilted either way for sawing draft on a pattern or it may be tilted forward for sawing at an angle. No additional locking device is required to hold the table in position. The wheels are 36 inches diameter, 2 inches across the face with a tire of good quality rubber band, securely cemented on and ground true. The rims and spokes are of steel and the hubs are bell shaped to bring the bearing directly under the strain of the saw. The upper wheel shaft runs in a double yoke box, with 9½-inch bear-



36-INCH MOTOR-DRIVEN BAND SAW.

ings and has a tilting device for shifting the saw blade to the desired cutting path. The machine will cut material 16 inches thick and to the center of a 72-inch radius.

The machines can be built either right or left hand, though the former is usually built. They can also be equipped for either direct or alternating current connections.

The Adrian Steel Casting Co., Adrian, Mich, has purchased the foundry business of W. E. Cook, and the Kells Foundry & Machine Co. It is the intention to move the foundry department to the Church Mfg. Co., where Amos Kells will have charge. Mr. Cook will continue his work in the machine shop and also on his clay working machines.

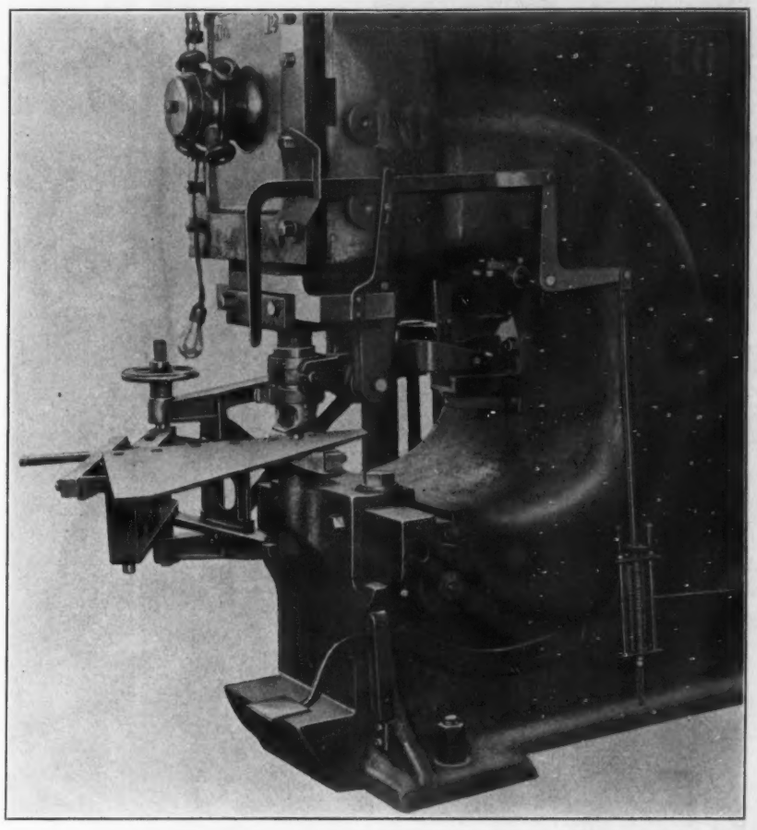
THE "WOGGLE" PUNCHING TABLE.

The accompanying illustration shows a novel punching table, which has been patented and placed on the market by the Standard Bridge Tool Co., Pittsburg. The device is known as the "Woggle" punching table, deriving its name from the many jointed framework table provided to carry the work to be punched under the die. It also comprises an indicator mounted on the stem of the punch, which serves to position accurately the holes to be punched and also to act as a stripper. The indicator is controlled by a suitable foot lever, which also controls the clutch of the punch. The indicator, however, is entirely independent of the movement of the punch. The machine is intended for punching all sizes and shapes of plates, such as details, gussets and other plates to a template and thus save the cost of laying out and marking.

In operation the piece to be punched is laid on the extended arms of the table over the die. A paper template with the desired spacing is clamped directly to the plate. The holes in the template are of the same size as the point of the indicator mounted on the punch stem. By depressing the foot lever, the indicator is brought down on the template, and the table at the same time is shifted until the indicator enters a hole in the template when a further depression of the foot lever releases the clutch and locks the indicator in its engaged position in the template to serve as a stripper. The indicator is released at the moment the punch is free of the material, and the table can again be shifted to punch the next hole.

With this table one man can handle the heaviest pieces within the capacity of the table with ease. Ordinarily, on this class of work, two men or more are required at the punch. The machine thus serves a two-fold purpose, reducing the labor at the punch and eliminating marking. The outfit, while primarily intended for punching material to a template, can also be used equally well for punching to mark or centers. Under these circumstances a gag is provided on the punch and the indicator is locked in the down position for stripping. The punch is run continuously and the gag is controlled electrically.

In operating for punching to cen-



THE "WOGGLE" PUNCHING TABLE ATTACHED TO PUNCH.

ters, the table is shifted beneath the punch to a position where the tip of the punch hits the center mark on the piece in the same manner as when operating with the template and the gag is then thrown in by means of an electric contact controlled by the foot lever. Operated in this manner punches can be speeded to about 38 strokes per minute and the operator can catch every other stroke of the punch.

The table, as shown, is attached to the side of the punch, but it can be mounted on any suitable support, such as a building column or framework. The table is of steel and equipped with roller and thrust bearings. The extended arms to carry material over the die can be adjusted to various sizes and shapes of pieces to be punched. A vertical adjustment is provided to keep the material free of the dies and there is also an adjustment for the indicator for the different thicknesses of pieces.

A COMBINED VERTICAL AND HORIZONTAL KNEE-TYPE MILLING MACHINE.

The accompanying illustrations show features of a combined vertical and horizontal knee-type milling machine, which has recently been brought out by the Ingersoll Milling Machine Co., Rockford, Ill. This machine is a powerful, single pulley gear driven tool designed to operate either as a vertical machine or as a plain horizontal machine, or as a vertical and horizontal machine at the same time. The internal construction of the driving mechanism, whereby power is transmitted to both the vertical and horizontal spindles, is shown in Fig. 2.

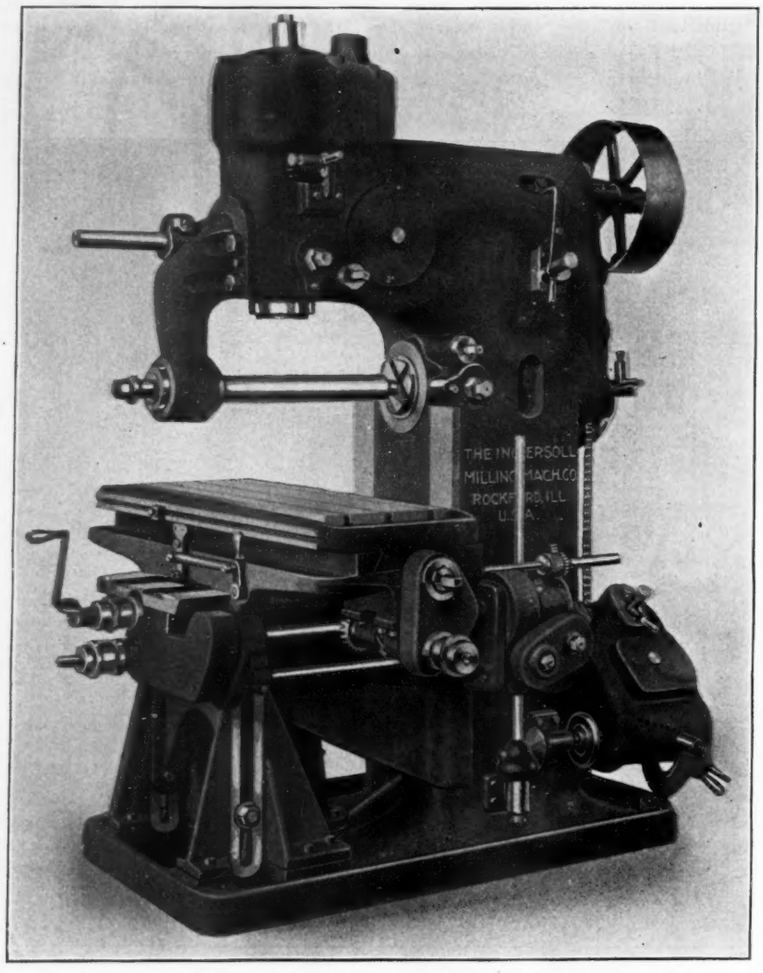


FIG. 1—COMBINED VERTICAL-HORIZONTAL KNEE-TYPE MILLING MACHINE.

Referring to Fig. 2 the drive is from a single speed belt on pulley 1. To the shaft of this pulley are keyed gears 3 and 4 these being moved by the lever on the side of the machine to mesh with gears 5 and 6 keyed to shaft 7. This shaft drives the gear train through which power is transmitted to the vertical spindle. Gear 8 drives the gear train, transmitting power to the horizontal spindle. Gears 9 and 10 are mounted on the spindle carrying the milling cutter, but run loose and have clutches cut on opposing faces, which engage with the sleeve clutch 11. By means of these gears four spindle speeds are obtained. The total number of spindle speeds is 16, they being obtained in a similar manner from gears on supplementary shafts, which are not shown in the drawing. The clutch sleeve 14 is keyed to the spindle 12 by a feather and slides on the spindle, which runs in a phosphor bronze box placed in a sleeve 7½ inches diameter. This sleeve has a horizontal movement of 6 inches and is adjusted by means of a pinion meshing with the rack shown cut in the side of the sleeve. The vertical spindle drive is a duplicate in every respect of the horizontal spindle drive and the spindles themselves are identical.

The feed motion is driven by a chain from the small sprocket on the driving shaft to the sprocket 13 near the bottom of the machine. This sprocket is mounted on two cones and is not keyed, but driven by friction. The cones are held in place on the sprocket by means of a heavy adjustable helical spring, which arrangement protects the feeds against shocks and sudden strains and eliminates all danger of breakage in the box. The cones are keyed to shaft 14, on which there are two spur gears. A clutch which gives two changes of speed to shaft 15 is operated by a handle E. On shaft 15 is mounted a cone of gears, with which a pair of gears mesh in successive steps on this cone to get the changes desired. This pair of gears is operated by lever E.

The total number of feed changes is 32, ranging from 5-8-inch to 20 inches per minute. These are independent of the spindle speeds. The longitudinal feed is 60 inches, the transverse feed is 16 inches and the vertical feed 17 inches. All these feeds are reversible. The feed is operated through the vertical shaft at the side of the machine and a reversing mechanism at 17 is provided to change the direction of the feed of the table and knee. The reversing mechanism is of the usual type of three miter gears, and is connected by means of spur gears to the worm wheel shown. The shaft leads to the screws for operating the table and knee. The lever 18 cuts out the feed of the table at the knee and also reverses its direction.

The machine has a table 72 inches long over all, and 22 inches wide. The

working surface is 60 x 20 inches, and is provided with T-slots cut from the solid. There is a quick hand adjustment to the table in either direction, longitudinally or transversely.

The knee is of heavy construction, firmly clamped to the frame. It is supported by adjustable braces in front and has power feed both up and down, together with hand adjustment. A hydraulic counterbalance is provided, which is operated by means of a pump on the machine. This takes from the elevating screw all strain, due to the weight of the knee, and the only pressure to be overcome by the screw is that caused by the operation of the cutter.

Each spindle is 4½ inches diameter in the taper. The spindles are made of hammered crucible steel and run in phosphor bronze boxes with taper cones for taking up lost motion. The main spindle gears are 14¼ inches pitch diameter, 4-pitch and 2½ inches face. The spindle speeds, which are 16 in number, range from 13 to 350 revolutions per minute. The greatest back gear ratio is 27.5 to 1.

From the top of the table under the vertical spindle the maximum distance is 27 inches. The minimum is 3 inches. From the top of the table to the center of the horizontal spindle the maximum distance is 17 inches and the minimum is zero. The distance from the center of the vertical spindle to the face of the housing is 20 inches. The machine weighs complete about 13,000 pounds. If motor-driven a 15-horsepower constant speed motor is used.

The illustration, Fig. 3, shows a machine engaged in work as a horizontal miller, while Fig. 4 shows it operating both as a horizontal and vertical machine.

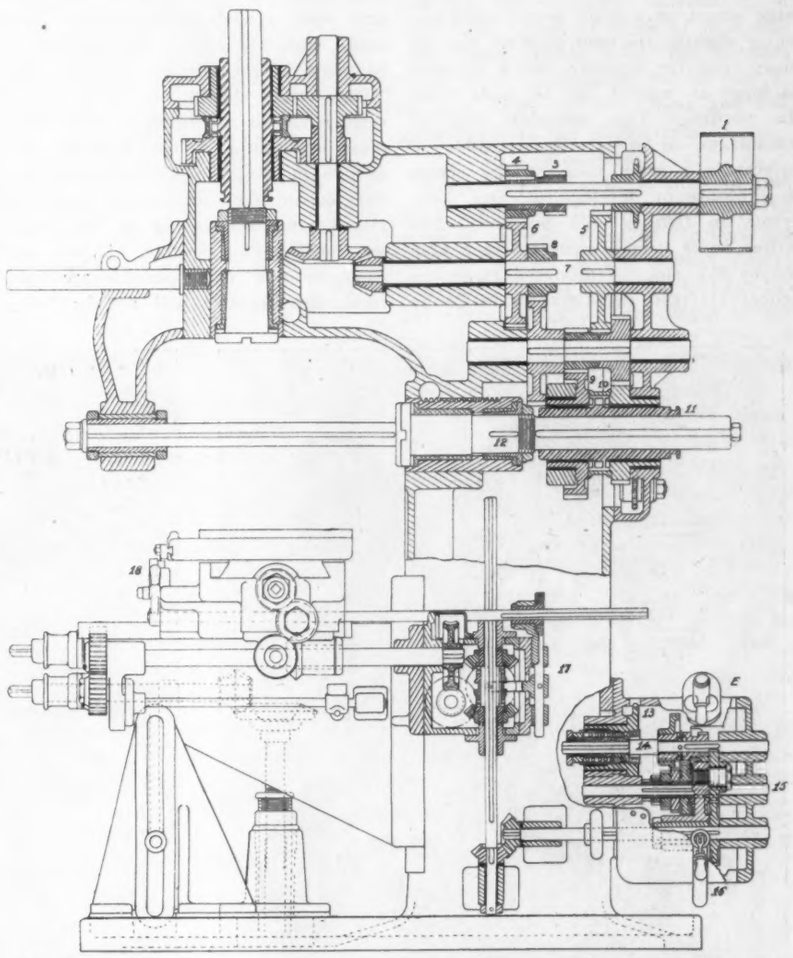


FIG. 2—SECTIONAL ELEVATION OF NEW VERTICAL-HORIZONTAL INGERSOLL KNEE-TYPE MILLER.

INDUSTRIAL PHOTOGRAPHY.[1]

BY S. ASHTON HAND.[2]

Photographs of machinery, interiors of shops, products of machines, processes of manufacture, etc., are generally made to aid the selling department of an establishment in disposing of its product. Sometimes the photographs themselves are used as an advertising medium, but in the majority of cases half-tones are made from them for use in catalogs, or for illustrations in trade journals. Catalogs have of late years developed into veritable works of art, and their preparation calls for photographic work of the highest order.

To this end it should be the aim of the photographer to produce prints that will require the least retouching when used for making half-tones, and this for two reasons: The retouching of prints for half-tone work is quite expensive; and the print that requires the least retouching gives much the best results in the finished half-tone. A print which requires very little retouching to produce a first class half-tone is a good one for all other purposes, but a print good enough for all other purposes may be a very poor one from which to produce a first class half-tone.[3]

Nearly all industrial establishments are equipped with a photographic outfit of some kind, and in some instances an experienced photographer is in charge; but in the majority of cases one of the draftsmen must take care of all the photographic work of the establishment, and it is in the hope of aiding some of the latter that this paper has been prepared.

Apparatus.

The camera should be a strong and serviceable one having a long bellows with very little cone. In fact, one with a perfectly straight bellows is best, as it allows greater adjustment of the lens board without danger of the bellows folds cutting off any of the object. The vertical and side swings should be ample.

The camera need not be larger than 6½ by 8½ inches and should not be larger than 8 by 10 inches, as anything over this size is cumbersome to handle, and requires a very expensive lens and a great deal of skill to operate. If

[1]A paper presented at the New York meeting (December, 1908) of the American Society of Mechanical Engineers.

[2]Superintendent, Chandler & Price, Cleveland.

[3]The reproductions in this paper were made from photographs upon which there was no retouching whatever.

large prints are wanted, bromide enlargements can be made up to any reasonable size, and if for any reason large direct or contact prints are wanted, a slightly enlarged positive can be made from the negative, and a negative as large as wanted can be made from the positive. This procedure has its advantages, as it is often possible to correct in a great measure any errors in exposure or development, and many errors in lighting and position. The writer never uses a camera larger than 6½ by 8½, and has produced many excellent enlarged negatives up to 24 by 36 inches by the method above mentioned.

The tripod should be solid and stiff with the fewest possible joints. An excellent thing for use with it is a triangle with sides about 36 in. long, and with a roller or caster under each point as shown in Fig. 1. With the tripod mounted on this arrangement, the camera can be moved any distance or in any direction without material change in level.

The lens should be the best obtainable, and too great emphasis cannot be placed on its being of long focus. Never under any circumstances should its focus be shorter than the diagonal of the largest plate with which it is to be used. It should be capable of rendering sharp definition from corner to corner of the plate when using a comparatively large diaphragm. A lens of this character will render the focusing much easier, and will enable the exposure to be made in the shortest possible time.

The plates should not be the most rapid made, as the emulsion with which these are coated is not generally rich enough in silver to give printing density for anything but portrait work, and also because the timing of the exposure must be very exact. Unless both exposure and development are just right, the negative will not be "snappy" enough to produce a good bright print. Very slow plates take long exposures, and unless skillfully handled in development will produce prints with entirely too much contrast. Plates of medium speed are the best and should be of the kind known as "double coated" or "non-halation." Plates of this kind are first coated with a slow emulsion, and after drying are again coated with a somewhat faster emulsion. Plates so coated allow of very great latitude in time of exposure.

If interior views are to be made where windows and other openings to the light have to be faced, then the plates should be coated on the back with a compound known as "backing." This will prevent to a great extent halation or blurring of the high lights caused by reflection of light from the surfaces of the plate under the emulsion. This "backing" should be washed off with a damp sponge before development.

Preparation of the Subject.

If a machine is to be photographed, it should be painted with a finishing coat of drab paint, which may be designated as "mouse color," and the paint should be so mixed as to dry absolutely "flat," that is, without any gloss whatever. If parts underneath the machine or in shadow are to be shown, they should be painted a lighter shade than the more prominent parts, and the deeper they are in the shadow the lighter they should be painted, even in extreme cases blending the color gradually into a white. All brightly polished parts should be daubed or rubbed over with a handful of soft putty to dull the brightness.

Unless these precautions are taken, the parts in shadow will show very dark in the photograph, and if very close together will be seen only as one shapeless mass, and the bright spots will show chalky white with very black lines and little or no detail. If letters or figures cast on any part of the ma-

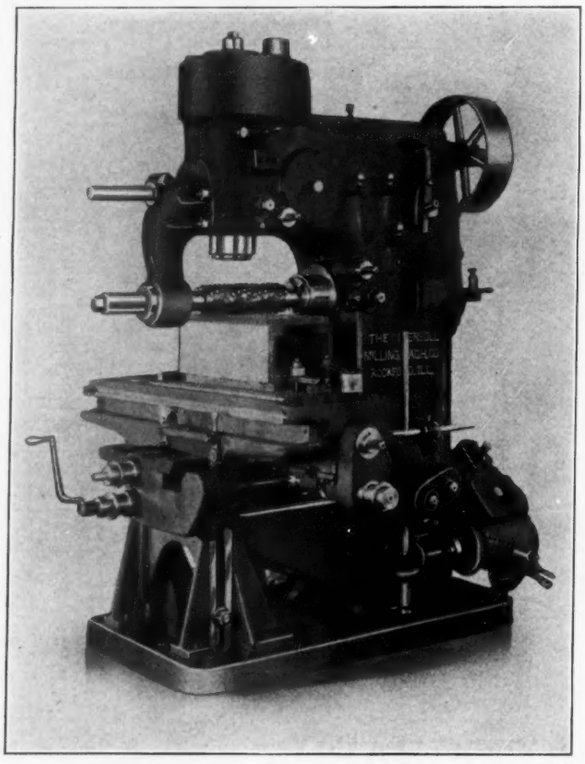


FIG. 3—MACHINE USED AS PLAIN HORIZONTAL MILLER.

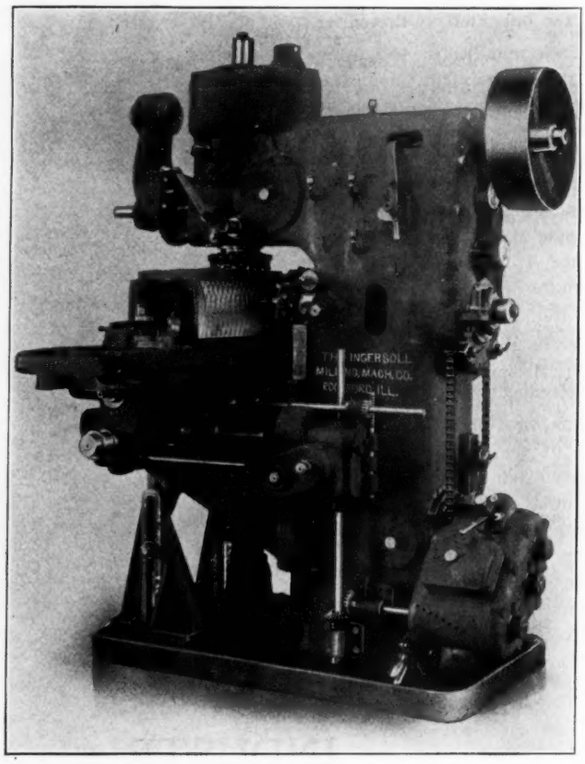


FIG. 4—MACHINE USED AS A VERTICAL AND HORIZONTAL MILLER SIMULTANEOUSLY.

chine are wanted to be shown, daub them with white paint from the end of a finger. Rubbing with chalk will give them a very rough appearance. It must be borne in mind that all high lights and shadows are greatly intensified in photography, and that a sensitive plate that will register all the gradation of tone as seen by the human eye has yet to be made. Fig. 2 and 3 are illustrations of machines that were properly prepared for being photographed.

If possible, it is best to photograph a machine before it has been run, otherwise oil from the bearings will seep out on the paint and leave dark and glossy spots which will look badly in the photograph. If the machine is to be run before being photographed, then it should not have its finishing coat until after the run or test is over. Before the finishing coat is put on, all the bearings should be thoroughly flushed with gasoline and the whole exterior cleaned with the same stuff to remove all oil.

Machinery should never be photo-

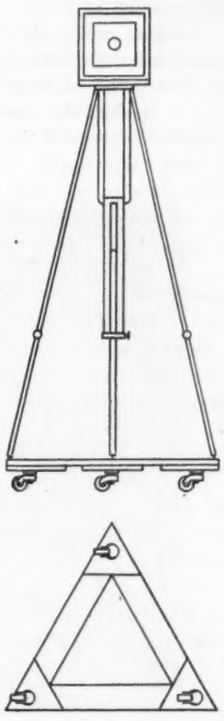


FIG. 1—TRIPOD WITH TRIANGULAR BASE.

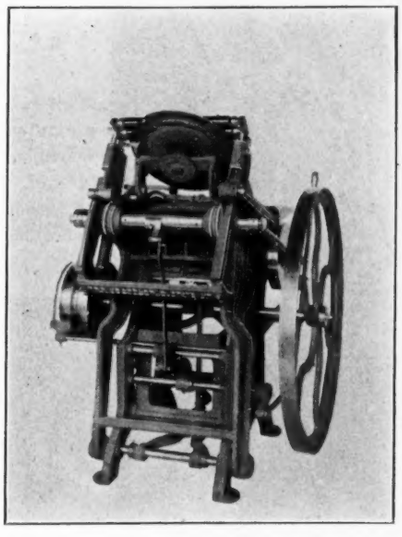


FIG. 2—DETAILS BROUGHT OUT AND SHADOWS AVOIDED BY PREPARATION OF MACHINE PARTS BEFORE PHOTOGRAPHING.

graphed out of doors or under a skylight, as there is too strong a top light which causes deep shadows. The light should preferably come from the north, and should fall on the machine at a downward angle of about 20 degrees from the horizontal. Cross lights from other windows should be avoided by pulling down the shades or tacking up heavy paper. Cross lights make a confusion of shadows and obliterate certain lines, giving the machine anything but a natural appearance. If necessary to photograph the machine by other than northern lighting, then make the exposure when the sun is overhead. If the exposures must be made when the sun is shining through the windows at any considerable slant, tack cheese cloth over the windows to diffuse the light.

A machine should never be photographed directly from the front, which will make it appear too flat. For depth, the camera should be placed enough out of center to show a little of one side of the machine and high enough to show a little of the top.

A background of heavy drilling, either white or very light in color, should be hung not less than 6 feet back of the machine. It should be of ample size—large enough so that the camera can be moved where wanted and still show the background behind every part of the machine. If there are folds or wrinkles in the background, have a man at each side take hold of the edges and shake the curtain slowly and gently during the whole time of the exposure. This will prevent the folds or wrinkles from showing in the photograph.

Shop floors are dark in color, and if a machine is photographed directly on the floor it is often puzzling to know where the lower part of the machine ends and the floor begins. Therefore a floor cloth of the same color and width as the background should be used. It should be deep enough to extend from 4 to 6 feet in front of the machine and under it and to the background. This will define the lower parts of the machine, and also reflect the light upwards, softening the shadows. Instead of a floor cloth, sheets or strips of light colored paper can be used, but be sure there is no pronounced red or yellow, as such colors are non-actinic and will show black in the photograph.

Focusing.

Never focus on the center of the ground glass, as this will give you the point of sharpest focus of the lens and what is wanted is the average focus; therefore focus at a position midway between the center and the edges of the ground glass. Get the nearest parts of the machine in focus. Small diaphragms will sharpen up the distant parts.

Sometimes a better effect can be obtained by pointing the camera slightly downward, but if at any time the camera is used in any other than a level position, the ground glass should be brought to a vertical position, otherwise the result will be distorted lines.

Fig. 4 shows a distorted view of a part of the side of a building, made by pointing the camera upward. If the photograph of a machine shows such

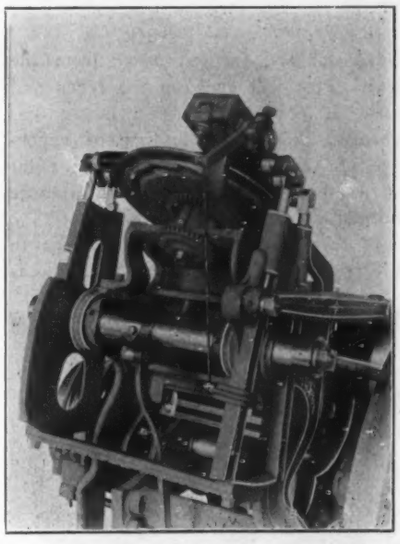


FIG. 3—DETAIL OF FIG. 2.

distortion, and for any reason it can not be photographed again, a negative can be reproduced eliminating the distortion, by placing the negative in a frame tilted at such an angle that the narrowest lines are nearest the lens, and making a positive in the camera, tilting the ground glass at an equal angle, but in the opposite direction. A negative can be made from this positive, as shown in Fig. 5, which was actually made from a negative reproduced in the above manner from that used for Fig. 4. Notice how much the top of the negative had to be enlarged to

bring the line parallel. Fig. 6 shows a camera and negative holder in the proper position for this operation.

If the machine to be photographed is a long one, requiring a raking view, use the horizontal swing to bring that part of the ground glass on which the image of the farthest part of the ma-

FIG. 4—DISTORTED VIEW MADE BY POINTING THE CAMERA UPWARD.

chine appears, farthest away from the lens. This will even up the focus and make it possible to use a larger diaphragm, shortening the time of exposure, and also extend the vanishing point to a greater distance, giving it a more normal perspective.

If there are perceptible vibrations to the floor on which the photographing is

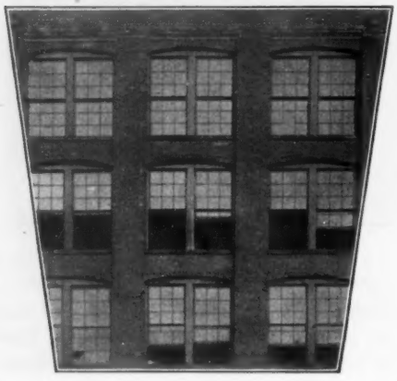


FIG. 5—DISTORTION OF FIG. 4. CORRECTED IN REPRODUCTION.

done, get three pieces of harness felt ½ inch thick, and 2 or 3 inches square. Place one of these on the floor under each leg of the tripod, and they will absorb all ordinary vibrations and keep the camera steady.

Exposure.

Exposures should always be ample, as an under-exposed plate can never be made to show that which the light has not impressed upon it (although it can be greatly helped by skillful development), but a moderately over-exposed plate can easily be treated in development, or even afterwards, so as to yield a first class print. Fig. 7 is an illustration of details brought out by long exposure in the dark part of a shop.

If in doubt as to the correct time of exposure, make a guess as near as possible. Suppose your guess to be four minutes, then put a loaded plate holder in the camera and draw the slide so as to expose 2 inches of the plate and make an exposure of two minutes; cap the lens, draw the slide out 2 inches more, and make another exposure of two minutes. Repeat this, drawing the slide 2 inches at a time, until the whole plate has been exposed. If the plate is an 8 x 10, there will be five parts having respective exposures of 10, 8, 6, 4, and 2 minutes each. Develop this plate, and it will be easy to tell which part has had the proper exposure, and from the position of this part the time can readily be found.

Interiors.

In photographing interiors, avoid pointing the camera towards windows if possible, but if this cannot be avoided, then cover the windows with heavy drilling or thick wrapping paper, fastening it well around the edges, so that no bright margins of light are visible. After the exposure has been made, the window coverings can be removed and

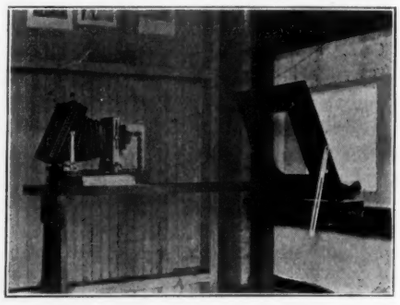


FIG. 6—CAMERA AND NEGATIVE HOLDER ARRANGED SO AS TO CORRECT DISTORTION IN FIG. 4.

an additional exposure of a fraction of a second can be given. This will give the windows a natural appearance and will often show objects on the outside. Interiors can be photographed without these precautions, but skillful work will be required to make good negatives.

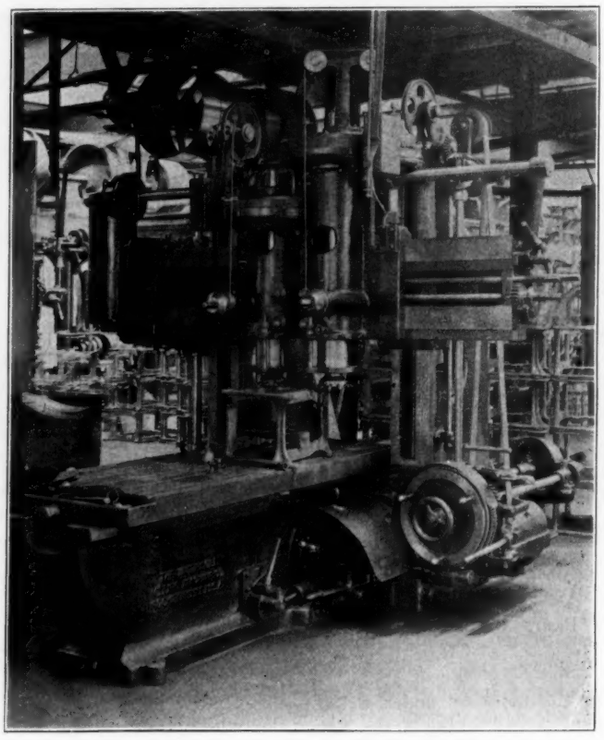


FIG. 7—DETAILS OF A DARK SHOP BROUGHT OUT BY LONG EXPOSURE.

Figs. 8 and 9 were made on a very bright day when snow was on the ground, and the light coming in the windows was intensely white. As the negatives were wanted in a hurry, no precautions were taken to soften or

stop out the light at the windows. The far end of Fig. 8 was a southern exposure, and the sunlight was streaming in at the windows. Fig. 9 is a view in the same room taken from the south end, where the light was so intense that

FIG. 8—PHOTOGRAPH FROM NEGATIVE WITHOUT SPECIAL PRECAUTION AGAINST STRONG LIGHT—STRONGEST LIGHT AT FAR END.

the milling machine in the foreground appears light in color, although it was painted a dark steel color.

Fig. 10 shows work in process in a special machine. This was made on the same day as Fig. 8 and 9, and with the camera pointed directly at the light. To work successfully under such conditions, the photographer must know to a nicety just how long a certain kind of plate may be exposed before halation takes place, and just how to get the best results in development from the shortest permissible exposure.

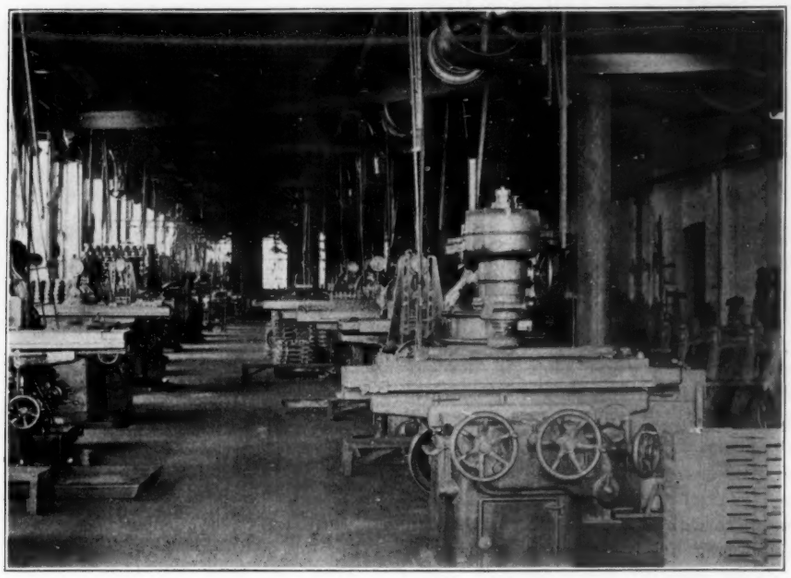


FIG. 9—SAME CONDITIONS AS IN FIG. 8, BUT WITH STRONG LIGHT IN FOREGROUND.

Copying.

In copying drawings or other subjects in black and white, it is necessary to use a very slow plate, give the shortest possible exposure, and use a concentrated and well restrained developer. Unless this is done, the lines of the drawing will not be clear and sharp.

If a copy is to be made from a blue print, it will be necessary to bleach the print in a weak solution of ammonia and water, and after a thorough washing, to immerse it in a weak solution of tannic acid. The part that was formerly blue will now be a rich purplish brown. The necessity for this treatment is that blue is an actinic color, and a negative made from such a print will have very little contrast; while brown is a non-actinic color, and a negative made from a print of that color will have plenty of contrast.

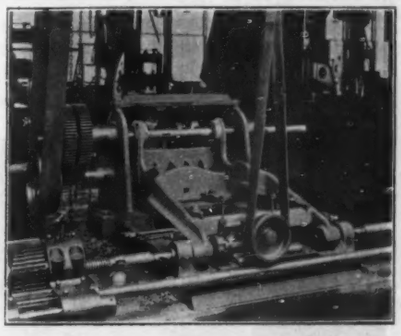


FIG. 10—PHOTOGRAPH ON SAME DAY AS IN FIGS. 8 AND 9. CAMERA POINTED DIRECTLY TOWARD LIGHT.

Enlarging Negatives.

A negative can be reproduced in a larger size by first making a positive in the copying camera, and then making a large negative from the positive by the use of the same instrument. If a negative is enlarged to many times its original size, a granular effect will be noticed. This is caused by magnification of the emulsion structure which is made up of countless thousands of hills and valleys. This granular effect can be eliminated by slightly over-exposing and greatly over-developing the

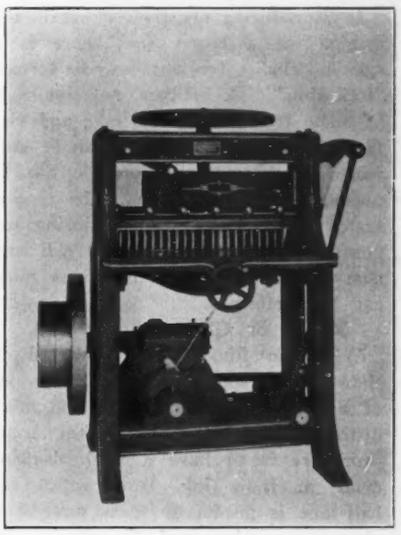


FIG. 11—PHOTOGRAPH OF A PAPER CUTTING MACHINE, SHOWING CLUTCH MECHANISM TO BE BROUGHT OUT BY PHOTOGRAPHIC METHOD.

original negative, and then reducing it to the proper density. The positive should have the same treatment.

Reduction does three things: *a* It reduces or clears the shadows faster than high lights. Therefore over-exposure is resorted to in order to increase the density of the shadows in proportion to the high lights, so that they shall bear proper relation to each other after reduction. *b* It thins the density of the

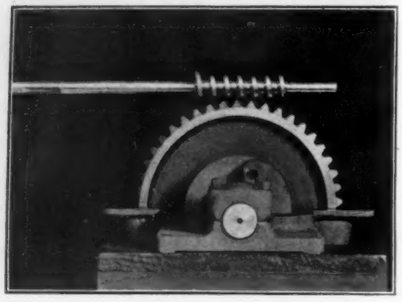


FIG. 12—PHOTOGRAPH OF WORM AND GEAR WITH UPPER PART OF CASE REMOVED.

negative or positive. Therefore over-developing is resorted to in order to have resulting density after reduction. *c* It cuts down the hills to the level of the valleys, so that very little if any granular effect is noticeable when the emulsion is magnified.

In reproducing negatives either in the original or a larger size, there is a splendid chance for what may be termed "jockeying." A brilliant negative may be made from a very flat one, and vice versa; errors in perspective can be corrected by the method shown in Fig. 5; unequal lighting can be corrected by judicious shading during exposure, and various stunts that will suggest themselves to the ingenious mind can be performed.

X-Ray or Ghost Photographs.

When an illustration is wanted to show clearly some hidden interior part of a machine in relation to and more distinctly than other parts, the usual procedure is to have a wash drawing made in India ink, from which the half-tone is produced. This method is always expensive, and the results are often very unsatisfactory.

Fig. 11 shows a power-driven machine for cutting paper, in which the power is transmitted through worm gearing and a positive clutch, all of which is enclosed in an oil tight case, as shown at the lower left hand part of the machine. An illustration showing the worm and worm wheel in mesh was wanted. An engraver was called in, who said he could do the job in a satisfactory manner. Blue prints showing both details and construction were furnished him as a guide to size and shape of the various parts, and their appearance when assembled. After repeated attempts, his results were not satisfactory, and it was decided to rely entirely upon photographic methods for the illustration.

The case and its contents were removed from the machine, and mounted on a box. The upper part of the case was taken off, leaving the worm wheel and the clutch collar exposed to view. The worm and shaft were removed from the upper part of the case and placed in their proper position in relation to the worm wheel, as shown in Fig. 12. A dark background was placed in the rear and an exposure was made. After the exposure the cap was put on the lens, the worm and shaft taken away, and the upper part of the case put in position as in Fig. 13. A light

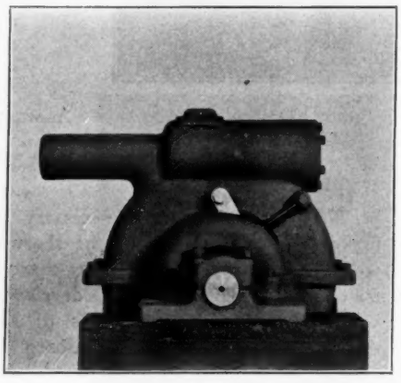


FIG. 13—EXTERIOR OF CASE TO BE PHOTOGRAPHED ON SAME PLATE WITH FIG. 12.

background was substituted for the dark one, and another exposure made on the same plate, the result of which is shown in Fig. 14.

Development.

Of the art of development much has been written, and more has been said, but the fact remains that the only adequate teacher is experience. After many years of experience, the writer would hesitate to attempt to tell in writing how to handle a sensitive plate in development. A few hints, however, concerning the behavior of certain mixtures of developer, may be of service. Too weak a developer makes a flat, thin negative; too concentrated a developer makes a negative with too much contrast; under-developing makes a negative lacking in printing density; over-developing makes a thick, dense negative requiring a very long time to print; an under-exposure should be developed with a diluted developer; an over-exposure should be developed with a concentrated developer well restrained with bromide of potash; developers, like artists' colors, should be mixed with brains; better choose a moderately slow developer, learn how to use it, and don't let any one persuade you to change it.

Printing.

Printing can be done in so many ways and on such a variety of papers, and the solutions necessary for developing and toning require such care in compounding and handling, that it can in most instances be better and more cheaply done by a professional.

Rapid Punching.—At the structural shops of the receivers of Milliken Bros. Inc. on Staten Island, New York City, recently, 143 tons of plates were punched in one day (8 hours, 47 minutes, to be exact) on one machine tool. The plates were 13-inch flange plates for girders, 5/8 inch and 11-16 inch thick and averaging about 32 feet in length. The average number of 15-16 inch holes was about 96 to each plate, staggered except at the ends. There were three sizes of plates and varieties of spacing; 52 of one kind, 168 of the second and 96 of the third. The total length of plate handled was 10,036 feet; weight 285,850 pounds, and total number of holes 30,384. This work was done on a multiple punch, four plates being passed through at a time. A few days previous to this, one man punched 12,740 9-16 inch holes, one at a time, in 10 hours. This was on light transmission line tower angles, on a

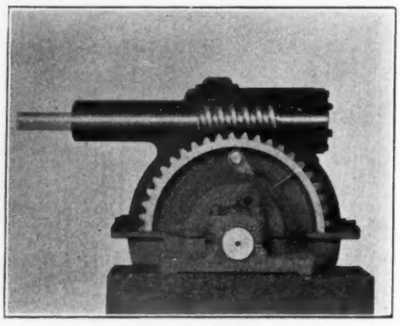


FIG. 14—RESULTS OF EXPOSURES FIGS. 12 AND 13 ON SAME PLATE.

light single stroke, quick acting punch. These performances are believed to be records in the line of rapid punching in the bridge shop.

Frank L. Rain has been appointed receiver for the Fairbury Iron Works & Windmill Co., Fairbury, Neb. The company closed its doors several weeks ago. The liabilities are given as $37,500 and the assets $40,000.

Week's Dullness in the Markets.

The market, beside developing weak tendencies in prices, became entirely professional and dull. Three facts of leading importance during the week included the rise of the Bank of England rate to 3 per cent, after having stood at 2½ per cent for nearly eight months; the Austro-Turkish settlement of the Balkan trouble, Turkey agreeing to accept $10,800,000 cash indemnity; and the announcement of the Russian loan for $240,000,000, to be brought out Jan. 22 at Paris.

A break in railroad shares Monday unsettled the market, which averaged slightly lower at the close. Prices again fell Tuesday; a further uncertainty developing Wednesday, resulting at the close of the general market in a lower average. The dull market of Thursday closed steady and firm; but with less activity Friday's prices averaged slightly lower, followed by considerable activity Saturday, the close being firm and higher all around. The net results of the week showed generally fractional changes either way; the volume of sales and other earmarks demonstrating that the buying public was apathetic.

Despite its far-reaching influence ultimately, the rise of the Bank of England rate was generally ignored in the stock markets. At the same time, the settlement of the Balkan situation, which had been eagerly looked for ward to for weeks, was also received by the stock markets of the world with more or less apathy. Thirty-day loans were made in New York as low as 1½ per cent, and time loans at the lowest rates for years. Gold amounting to $3,500,000 was shipped from New York to Paris.

The idle car report showed the rather startling increase of 110,945 cars, bringing the gross surplus up to 333,019, which is within 80,000 of the maximum surplus of the year at the end of last April. Business failures for the week were 319, compared with 329 the previous week and 431 the corresponding week of 1908. Bank clearings showed a gain of 23.9 per cent over the corresponding week last year. The bank statement showed the largest increase in deposits in the history of the clearing house banks, $46,109,900. The total surplus now stands at $27,509,475, which compares with $22,635,475 a year ago, and $18,460,700 two years ago. The bank statement showed loans increased $27,550,900; deposits increased $37,225,800; and the percentage of actual reserve 27.06, a decrease of 0.02. State banks and trust companies reported loans decreased $19,972,600; net deposits decreased $14,016,300; and the percentage of reserve 30.4, an increase of 1.7. Shares were sold to the number of 3,973,640, compared with 5,985,742 the preceding week and 4,889,700 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $27,355,000, compared with $36,554,000 the preceding week and $21,889,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Jan. 16	Changes in Week	Date 1908 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	14⅜	— ⅝	Sept. 3	19,820,000			
Allis-Chalmers pr	47	—1		16,150,000	7 cum	1¾ Q.	Feb., 1904
American Can	8¾	— ¾	Feb. 3	41,233,300			
Am. Can pr	72¾	— ¼		41,233,300	7 cum	1¾ Q.	Jan., 1909
Am. Car & Foundry	48¾	— ⅛	June 25	30,000,000		½ Q.	Jan., 1909
Am. Car & Fdy. pr	108	—1¾		30,000,000	7 n. c.	1¾ Q.	Jan., 1909
American Loc.	56¼	....	Oct. 20	25,000,000	5	1¼ Q.	Aug., 1908
American Loc. pr	111	.....		25,000,000	7 cum	1¾ Q.	Jan., 1909
American Ship	58⅝	+ ⅜	Oct. 14	7,600,000	4	1 Q.	June, 1908
American Ship pr	105	— ⅛		7,900,000	7 n. c.	1¾ Q.	Oct., 1908
Am. Steel Foundries(new	38	— ¾	Oct. 6	15,810,000			
Am. Steel Foundries. pr.	47⅛	.....		14,247,400	6 cum	2½	Aug., 1904
Barney & Smith	40	.....	June 2	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith pr	110	.....		2,500,000	8 cum	2 Q.	June, 1908
Bethlehem Steel	24	— ¾	April 7	14,862,000			
Bethlehem Steel pr	51	—1		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	38¾	+ ¼	March 17	45,000,000*	6	1½ S. A.	Aug., 1908
Cambria Iron	46	.....		8,468,000*	4	2 S. A.	Sept., 1908
Chicago Pneumatic Tool.	26	—1½	Feb. 17	6,145,800	4	1 Q.	Oct. 1907
Colorado Fuel	41	— ½	Oct. 19	34,235,500		3½	April, 1902
Crucible Steel	8	— ⅛	Oct. 21	24,578,400			
Crucible Steel pr	60¼	+2¼		24,436,500	7 cum	1 Q.	Dec., 1907
Empire Steel	6	.....	Feb. 26	1,254,770			
Empire Steel pr	47	.....		2,500,000	6 cum	3 S. A.	July, 1908
Fay & Egan	90	.....	Feb. 18	1,000,000	6	1½ Q.	Nov., 1908
Fay & Egan pr	100	.....		1,000,000	7 cum	1¾ Q.	Nov., 1908
General Electric	155½	—1	May 12	65,167,000	8	2 Q.	Oct., 1908
Harbison-Walker	18½	+ ⅛	Jan. 20	18,000,000		½	Oct., 1907
Harbison-Walker pr	81	.....		9,000,000	6 cum	1½ Q.	Oct., 1908
International Pump	40⅛	+ ⅜	June 2	17,787,300		1	April, 1905
International Pump pr	86⅜	+2⅛		13,835,000	6 cum	1½ Q.	Nov., 1908
Lackawanna Steel	43	—4	March 11	34,971,400			
Lake Sup. Corp	15¾	+ ½	Oct. 7	40,000,000			
New York Air Brake	86¾	—3¾	June 18	8,012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	97	.....	Feb. 5	8,500,000	6	1½ Q.	Dec., 1908
Niles-Bement-Pond pr	100	.....		2,000,000	6 cum	1½ Q.	Nov., 1908
Otis Elevator Co.	42	—1	March 16	6,156,600		1½ S. A.	April, 1908
Otis Elevator Co. pr	93	.....		5,449,500	6 n. c.	1½ Q.	Jan., 1909
Penn. Steel	50	.....	May 11	10,750,000			
Penn. Steel pr	103¾	— ¾		16,500,000	7 n. c.	3½ S. A.	Nov., 1908
Pittsburg Coal Co.	13	.....	Feb. 10	28,853,400			Nov., 1906
Pittsburg Coal Co. pr	49	.....		27,030,800	7 c.	1¾	April, 1905
Pressed Steel Car	41	—1	Feb. 19	12,500,000		3	Aug., 1904
Pressed Steel Car pr	102	.....		12,500,000	7 n. c.	1¾ Q.	Nov., 1908
Pullman	170	.....	Nov. 11	100,000,000	8	2 Q.	Nov., 1908
Railway Stl. Spring	46	— ¾	March 5	13,500,000	4	2 S. A.	Oct., 1908
Railway Stl. Spring pr	101	—1½		13,500,000	7 cum	1¾ Q.	Sept., 1908
Rep. Iron & Steel	25	— ½	Oct. 21	27,191,000			
Rep. Iron & Steel pr.	86½	— ¾		20,416,900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	77¼	—1¾	March 11	10,000,000	5	1 Q.	Dec., 1908
Sloss-Sheffield pr	109¾	— ⅛		6,700,000	7 n. c.	1¾ Q.	Jan., 1909
U. S. Pipe & Fdy.	29¼	— ¾	June 24	12,500,000	4	1 Q.	Dec., 1907
U. S. Pipe & Fdy pr.	75¾	—1¾		12,500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	52⅛	+ ⅜	April 20	508,302,500	2 n. c.	½ Q.	Dec., 1908
U. S. Steel pr.	114	+1¼		360,281,100	7 cum	1¾ Q.	Nov., 1908
U S. Steel 5;	103⅜	+1¼		463,798,000	5	5 A.	
Va. Iron, Coal & Cke	61	—3	Nov. 17	9,073,680			
Westinghouse Elec	80¾	—4¼	June 24	28,933,200	10	2½ Q.	Oct., 1907
Westighouse Air Brake	110	—1	Oct. 6	14,000,000*		2½ Q.	Jan., 1909

Par value of shares, $100, except those starred (*), $50

Copper Stocks.

New York.—Amalgamated Copper closed 80½, a net loss of 1⅜.

Boston.—Butte Coalition closed 25½, a net loss of 1¼; Calumet & Arizona closed 116, a net loss of 1; Calumet & Hecla closed 670, a net gain of 5; North Butte Mining closed 81, a net loss of 1⅜; Quincy Mining closed 92, a net loss of 3.

Financial Notes.

The International Steam Pump Co. declared the regular quarterly dividend of 1½ per cent on preferred stock, payable Feb. 1; the Harbison-Walker Refractories Co., the regular quarterly dividend of 1½ per cent on preferred, payable Jan. 20. The New York Air Brake Co. has announced that it proposes to increase its capital stock from $10,000,000 to $13,000,000, to provide for the conversion of the $3,000,000 first mortgage 6 per cent bonds, the privilege to begin July 1, 1909. The Westinghouse Electric & Mfg. Co. has applied to the New York stock exchange to list $3,240,000 additional assenting stock.

NEWS FROM MANY INDUSTRIES

New Buyers:—

P. O. Campbell, Oliver Miller, E. F. Gordon and others have incorporated the Grant Zinc Co., Joplin, Mo., with $50,000 capital.

The Fletcher Enamel Co., Anderson, Ind., has been incorporated by U. G. Fletcher, Solon Fletcher and U. V. Ream, with $50,000 capital stock, to manufacture and sell sheet metal and kindred products.

Robert Mancill, Chester Walters, William Bell, Samuel J. Phillips and others have incorporated the Canadian Road Machine Co., with $60,000 capital stock and principal office at Hamilton, Ont.

The St. Francis River Land & Iron Co., Poplar Bluff, Mo., has been incorporated with a capital stock of $1,000,000. The incorporators are: A. S. Pickel, W. W. Turner, C. A. Freer and Della Hooper.

The McMullen Machinery Co., Grand Rapids, Mich., to manufacture machinery and factory equipment with $15,000 capital stock, has been incorporated by George K. McMullen, Burt D. Smith and A. C. Hindman.

The Milwaukee Pattern & Mfg. Co., Milwaukee, Wis., has been granted a certificate of incorporation. The capital stock is placed at $20,000, and the incorporators include Emil Seidel, F. A. Drolshagen and Daniel W. Hoan.

The McNaull Boiler Mfg. Co., Toledo, O., has been incorporated by G. W. Walbridge, A. B. Laskey, E. H. Winkworth, E. C. Hampton and Percy F. Parrock. The capital stock is $50,000. The company's plant is on Cherry street, Toledo.

A charter has been granted to the Welded Steel Wheel Co., Ellenville, N. Y., capitalized at $100,000. J. William Corrigan and Guy Osborn, Mt. Vernon, N. Y., and J. W. Ebbs, Englewood Cliffs, N. J., are the incorporators.

Cooper S. Hammond, William G. Cox and Charles C. Wheeler are the incorporators of the Hammond Sheet Metal Mfg. Co., St. Louis, Mo., which has been chartered to manufacture and deal in sheet metal, etc. The capital stock is $10,000.

The Chicago Saw Sharpening Machinery Co., Chicago, to manufacture machinery and tools with $12,000 capital stock, has been incorporated by Charles H. Kellerman, A. D. Mattison, Robert C. Barr, Pratty Bros. & Jarvis, 134 Monroe street, Chicago.

Articles of incorporation have been filed by the Kankakee Car Co., Kankakee, Ill., capitalized at $130,000, authorizing it to build and repair rolling stock of all kinds, cars, etc. Leroy J. Vierson, W. J. Wesloh and Adolph Stankowitz are given as the incorporators.

The Wayne Iron & Lumber Co., St. Louis, Mo., has been chartered by James W. Vandolah, Charles P. Scrogin, Lexington, Ill.; G. A. Long, Greenville, Mo.; W. N. Mitchell and E. W. Demse, of Chicago; James A. Plotnar, J. T. Long, Kansas City, Mo. The capital stock, fully paid, is $2,500,000.

The Nelson Valve Co., with $1,000,000 capital stock, has been incorporated by Treasurer Russell Bonnell, 908 North Broad street, Elizabeth, N. J. The directors include Samuel F. Houston, Chestnut Hill, Philadelphia, Pa.; Carlisle Mason, Wyndmoor, Pa., and Russell Bonnell, Elizabeth, N. J.

A charter has been granted to the Metallic Railroad Tie Co., Shirley, Ind. The capital stock is $10,000, and the company will manufacture and sell metallic railroad ties. Those interested are: George Williams, Frank Gordon, James McCune, Otto McCune, John D. Smith, William Bates and Virgil Balding.

The Reliable Novelty & Electric Co., Binghamton, N. Y., has been incorporated with $5,000 capital stock by the following: Fred W. Newman, Gustavus Millard, Robert T. Hullar, Louis Z. Green and Frank D. Croft, all of Binghamton, N. Y. The company will manufacture electric motors, machinery, etc.

The Dodge Corrugated Iron Co., Sioux City, Ia., has filed articles of incorporation with $15,000 capital stock. The company will handle corrugated iron, wholesale, in the shape of tanks, culverts, bins, etc. C. E. Kitchin, of Sioux City, and James Fitzpatrick and C. L. Carter, of Fort Dodge, are the incorporators.

The William Hunter Machine Co., Hoboken, N. J., mechanical and general engineering, has filed articles of incorporation with $25,000 capital stock. William Hunter, 1118 Clinton street; William Clark, 1302 Garden street, both of Hoboken, and John Henry Susse, 327 Fifth street, Town of Union, are the incorporators.

The American Fence & Iron Co., Covington, Ky., has been granted a certificate of incorporation for manufacturing iron fences, etc. The capital stock is $20,000, and the incorporators are: Joseph R. Stevens, Christian C. Weber, Edward A. Weber, Frank L. Branson, D. H. Stevens and Braden H. Stevens.

The Charm Air Regulator Co., Brooklyn, N. Y., to manufacture iron, brass, steel and other metal, with $10,000 capital stock, has applied for a charter. The incorporators are: Art. J. Fowne, 9 West Sixty-eighth street, New York city; William H. Garrison, 2006 Caton avenue, Brooklyn, and Edmund Florant, 156 West 101st street, New York city.

With $50,000 capital stock, the Huron Steel & Iron Co., New York city, has been incorporated to manufacture, mine and deal in iron, steel and other metals, coal, coke and their products. The incorporators are: Edgar Joseph, 250 West 128th street, New York city; Claude B. Weverm, 111 Amersfort place, Brooklyn, and James J. Wilson, 288 St. Nicholas avenue, New York city.

A charter has been granted to the Mecca Machinery Co., New York city, to manufacture and deal in machinery, mechanical devices, etc., with $50,000 capital stock. The incorporators are John W. Danielson and Horace L. Roberts, 551 Fifty-first street; John E. Dahlgren, 298 Flatbush avenue, Carl B. Larson, 448 East Sixty-third street; and Charles B. McKeever, 1181 Hancock street.

Articles of incorporation were granted to the Standard Fuel & Iron Co., Birmingham, Ala., for the purpose of manufacturing iron, conducting a general mining business, and furnishing gas, electricity and water. The company is authorized to begin business with a capital of $10,000, and has these officers: H. J. Falls, president; R. C. Henderson, vice president and treasurer, and James L. Davidson, secretary.

New Construction:—

The Cape Ann Tool Co., Pigeon Cove., Mass., is building a steel storehouse, 60 x 75 feet, upon which steady progress is being made.

Machinery is being installed in the enlarged shops of the American Steel Wheel Co., Alexandria, Ind. The new building is double the size of the original factory.

The J. G. Brill Co., Philadelphia, has let the contract for a one-story steel frame storage house, 40 x 160 feet, to be built at the car works plant at Sixty-second street and Woodland avenue.

The Empire Iron & Steel Co., Niles, O., will add two new hot mills to its plant at once. The contract

for furnishing the plates and other necessary iron work has been awarded to the Mineral Ridge Mfg. Co.

The Umckrich & King Knife & Machine Co., Galion, O., is erecting an addition to its present building, 16 x 24 feet. Recently the company was compelled by increasing business to install a heavy lathe and planer.

C. H. Black and Walter M. Olive are having plans drawn for a concrete building, 25 x 120 feet, to be constructed at Wenatchee, Wash., and to be used as a foundry and wagon making plant. Ray Woodruff, of Wenatchee, is interested in the foundry.

The Merrimac Boiler Works, Lawrence, Mass., is having some new equipment installed in its shops, including a 15-ton crane, which is planned to serve a rivet machine. An air compressor is also being installed to operate various pneumatic tools.

The Atlas Foundry Co., Marion, Ind., has begun operating in the building formerly occupied by the Ward Fence Co., complete foundry equipment having been installed. The company will manufacture small castings, including lawn mower parts for which it holds a large contract.

The Jeffrey Mfg. Co., Columbus, O., has closed a contract with the Interstate Steel Co., for 15,000 tons of structural material, which will be used in the erection of new buildings and additions to existing buildings. Work on the new structures will be begun in a short time.

F. W. Dodd Structural Iron Co., Des Moines, Ia., has taken a long-time lease on additional ground space south of the plant on South Pelton avenue, and is having plans made for enlarging its facilities. The additional space thus secured practically doubles the ground room occupied.

The Bessemer Soil Pipe Co., Bessemer, Ala., is having drawings made for plant improvements, upon which work will commence shortly. Fourteen new floors will be added, ranging in size from 2 to 6-inch pipe. This will necessitate doubling the size of the building and installing a new cupola and new engine and boiler equipment.

The foundry department of the Frank Gruber Boiler & Machine Works, Fort Wayne, Ind., has been leased by Joseph Steib, who assumed the lease upon the retirement of W. E. Herdin. An addition to the present buildings, 60 x 100 feet, will be made, and the foundry building will be located on the north end of the property, occupying a space 60 x 70 feet. When completed, the foundry will be provided with a new cupola and an overhead track system. South of the new foundry building a machine shop, 30 x 40 feet, will be constructed and equipped with lathes, drill presses, etc., and in addition a smaller room for a storehouse. The second floor of the machine shop will be used for a pattern shop.

The Marshall & Huschart Machinery Co., Chicago, has purchased ground at 72 West Madison street, 53.5 x 89 feet. The rear part of this lot adjoins another property already owned by the company. The Marshall & Huschart company plans to erect a building that will cost $250,000, to be built of concrete and eight stories high.

The remodeling of the Union stack at Ironton, purchased by Rogers, Brown & Co., has progressed steadily. So extensive are the improvements that the furnace will be practically a new one. It will be two or three months before the furnace will be ready to blow in.

The Brighton Car Co.'s new plant at Minneapolis is nearing completion. The main building, 90 x 150 feet, is being equipped with special machinery and dynamos, and the blacksmith shops are also being completed. It is believed that within two weeks the plant will be operating. Further additions will be made, and by April 1 it is thought that the full force of 1.000 men will be employed.

The Star Foundry Co., Inc., Seattle, advises that the new corporation succeeds Reed Bros. & Dodds, which has been operating a foundry, whose equipment includes a 26-inch cupola, modern foundry practice appliances and a new 38-inch molding machine. Special attention will be given to light weight castings. The company announces that it expects business conditions will warrant its installing a machine shop some time during the year.

The Screw Cutting Co. of America, Philadelphia, advises respecting its requirements in the machinery line to be placed in its new building now under construction that it is having 25 special screw cutting machines constructed which will produce accurate work from 0 to 4 inches in diameter, any length, pitch and style of thread. It is equipped at present with a fair sized factory and can cut screws from 0 to 6½ inches in diameter, any length, and from 0 to 12 inches in diameter, 18 inches long.

Equipment, including machinery, which will increase the total investment to more than $2,000,000, is being installed by the Marquette Cement Mfg. Co., of Chicago, at its works at La Salle, Ill. The improvements will increase the output 50 per cent over that of last year, bringing the total to 6,000 barrels daily of portland cement.

General Industrial:—

The Dundee Brass Mfg. Co., Dundee, N. Y., is installing both brass tubing stock as well as machinery, and will commence operating about Feb. 1.

The Hill & Griffith Co., Cincinnati, maker of foundry facings, has increased its capital stock from $100,000 to $150,000 to make improvements and extensions.

The Brass Foundry & Heating Co., Peoria, Ill., has sold its plumbing department and instead of handling plumbing supplies it has installed a line of gas engines and automobiles.

The Fremont Foundry Co., Fremont, Neb., at its recent annual meeting, declared a dividend of 7 per cent on common stock and 6 per cent on preferred. The old officers of the company were re-elected.

The Mack Iron Works Co., Sandusky, O., advises that its recent incorporation is simply to take over the business of the Ohio Structural Iron Co., manufacturer of ornamental, architectural and light structural iron, steel and wire work.

The Cincinnati Steel Foundry Co., which was incorporated recently with $50,000 capital stock, will occupy the old plant of L. Jones & Sons Foundry, Kenyon avenue, Cincinnati. John L. Hopper, who was recently with a steel foundry in Minneapolis, will be in charge of the business.

The Youngstown Sheet & Tube Co. plans to construct an 8-foot automobile road throughout the plant in order that every part of the furnaces and mills can be reached by automobiles. The road is built with an elevation of one foot for drainage, is of macadam and will be kept oiled.

Charles A. Vaughn, of Milford, Del., has purchased the Haven Lake shops, warehouses, etc., formerly owned by the George S. Gries & Son Foundry & Machine Co., manufacturer of agricultural implements. Mr. Vaughn has equipped the plant for the production of modern drop forgings, tools and dies, which have been his manufacturing specialty for 30 years.

James Fitzpatrick and C. E. Carter, of Fort Dodge, Ia., have been arranging for opening at Sioux City, Ia., a branch of the Dodge Corrugated Iron Works. The location has been secured and the installation of ma-

chinery has been commenced. The company manufactures culverts, drain bins, water and dip tanks. Charles Kitchen has been named manager of the Sioux City plant.

The Lehigh Valley Railroad Co. has just launched the first of a number of steel coal barges, which are being built for service in the transportation of coal from Perth Amboy storage yards to points along the eastern coast. Their length over all is 200 feet, breadth 35 feet, and draught, loaded, 1,900 tons, 17 feet.

The stockholders of the Interstate Brick Co., Youngstown, O., recently incorporated with a capital of $100,000, have now elected the following officers and directors: President, Walter L. Kauffmann; vice president, William McIntosh; secretary and treasurer, M. S. Logan; Robert Bentley and F. D. Zug. The site for the company's plant has been selected near the quarries of the Carbon Limestone Co., Hillsville, Pa., on a branch of the P. & L. E. railroad. It is planned to have the plant operating by the middle of the coming summer.

The annual meeting of the Whitman-Barnes Mfg. Co. was held recently, when reports of the various officers showed that its business had been very successful during the year. The following officers and directors were elected: President, C. E. Sheldon, of Akron, O.; vice president, William Stone, of Chicago; secretary and treasurer, George A. Barnes, of Akron, and treasurer, W. H. Eager, of Chicago; George T. Perkins, A. B. Rinehart, A. D. Armitage and C. I. Brunner, of Akron, and William H. Gifford, Syracuse, N. Y.

At the annual meeting of the stockholders of the Beatrice Iron Works, Beatrice, Neb., the following directors were chosen: A. J. Trude, Dr. H. M. Hepperlen, A. D. White, H. A. Thompson, Hunter Millen, August Schaffer and James Smethers. The directors organized by electing Mr. Trude president and general manager; Dr. Hepperlen, vice president; Mr. Schaffer, secretary and treasurer, and Mr. Millen, superintendent. The annual reports received showed a flattering increase in the business, although the company has been in existence only a little over 18 months.

Edward C. Hughes, receiver of the Franklin Rolling Mill & Foundry Co., Franklin, Pa., is advertising for public sale Feb. 1, at the offices of the company, all the property, corporate rights and franchises of the Franklin Rolling Mill & Foundry Co., together with all machinery, appliances, etc. The real estate includes 12 acres. The buildings consist of steel constructed mill buildings of various sizes equipped with trains of rolls, heating furnaces, lathes, rail shears, hot saw, etc. A number of patent rights for steel tower manufacture, granted not only in the United States but in Canada, Great Britain and other European countries, are included. The receiver offers the property pursuant to an order of the court of common pleas of Venango county, Pa.

The New York Engine Co., which has a large plant in operation at Watertown, N. Y., has been granted a charter for the purpose of developing in this country a suction gas engine and producer which has been in use abroad a number of years. The company's plant, which is fully equipped for this class of work, is at present turning out engines of from 15 to 96 horsepower, and expects to build engines up to 500 horsepower. The officers of the company are: William N. Shaw, president; C. A. Starbuck and John C. Thompson, vice presidents, and C. H. Chaffee, secretary and treasurer.

The Ohio State Stove Co., of Columbus, O., which was recently incorporated with a capital of $75,000, has purchased the factory building on West First avenue, formerly occupied by the Columbus Lithograph Co. The work of remodeling the building has been started and part of the machinery to be used in equipping the stove foundry has arrived. The company will make gas stoves, ranges, heaters and ovens. All of its patterns and designs will be new and original. It will employ at the start about 100 men. F. W. Long will be president and general manager, W. B. Thomas vice president and treasurer, and M. L. Parker, secretary.

George R. James and W. A. Hein, representing the Memphis Steel Construction Co., Memphis, Tenn., have announced the purchase of the Odlum-Taylor Boiler Works, located in North Memphis. The further announcement is made that the Steel Construction company will begin at once the establishment of a structural steel and bridge works, the new buildings to be erected on a portion of the nine acres of ground included in the purchase. C. J. Rofelty has been appointed chief engineer. The property is admirably located as to railroad facilities, switches extending from the main line of the Illinois Central and the Union Belt Line into the works.

Trade Notes:—

William S. Nichols, 253 Broadway, New York City, has secured the sole rights for the manufacture and sale of the "Economy" emery frame or grinder, and will place it on the market at once.

Announcement is made that the business heretofore carried on by the American Engineering & Specialty Co., with headquarters at Chicago and branches throughout the middle west, will be conducted after Jan. 1 under the name of Warren Webster & Co., with main office and works at Camden, N. J. This implies no change in the personnel of the "Webster service," an organization of 20 years' standing, having experience in more than 4,000 successful installations.

The large new works of the National Sanitary Mfg. Co., located at Salem, O., are equipped throughout with the "Kirkwood" system of fuel oil burning as manufactured by the Tate, Jones & Co., Pittsburg, Pa. Due to the peculiar topographical conditions, it is necessary to lift the oil to quite an elevation in order to reach the furnaces where it is used, yet so perfect is the system that but one side of the ordinary pumping system is required. Due to the uniform heat secured, the low cost of maintenance and the little care required, it is found to be most admirably adapted for this particular purpose. The Salem company manufactures high quality bath tubs and other sanitary articles.

Fires:—

The engineering works of M. W. Cunliffe, Rossland, B. C., was damaged to the extent of about $6,000, Jan. 6.

The boiler shop of Fairer & Co., Columbia, Pa., sustained damage to the amount of about $4,000, Jan. 8.

The shop and contents of the Burns Boiler Co., Green Bay, Wis., were damaged to the extent of about $3,000, Dec. 28.

The machine shops of Jacob Bittner and the T. W. Gurley Mfg. Co., Meyersdale, Pa., were badly damaged, the loss reaching $15,000, Jan. 4.

The plant of the Memphis Machine Works was badly damaged Jan. 7 by a fire which started in the engine room. The loss will reach about $30,000, with $28,500 insurance. The plant will be rebuilt.

SECOND-HAND "HIGH GRADE" MACHINERY

BORING MACHINES

(1) 2B Binsse Horizontal
(1) " F" Baker Special
(1) 8 in. Bar Lucas—42 in. table
(2) 30 in. Bullard
(1) 37 in. Bridgeport—(1) head
(1) 84 in. Betts, 2 heads
(1) 10 ft. Pond floor boring machine

DRILL PRESSES

(8) Barnes Friction
(4) 1-spindle sensitive
(3) 2-spindle sensitive
(1) 4-spindle Reed sensitive
(1) 6-spindle Quint turret
(2) 20 in. Barnes upright
(1) 21 in. Pratt & Whitney
(2) 24 in. Baker high speed
(4) 25 in. W. F. & J. Barnes
(2) 26 in. Lodge & Davis
(1) 30 in. Prentice Bros. (new)
(1) 83 in. Bement-Miles
(1) 34 in. Barnes—gear feed
(1) 24 in. Fosdick Radial

GEAR CUTTERS

(1) Grant-Lees hobbing machine
(1) 30 in. x 8 in. Brainard spur
(1) 36 in. x9 in. x5p Gould & Eberhardt
(2) 50 in. x11 in. x3p Gould & Eberhardt

GRINDERS

(2) Cincinnati Cutter & Tool
(1) Pratt & Whitney cutter and surface
(1) No. 2 Brown & Sharpe Universal

LATHES

(1) 10 in. x 4 ft. Davis [ment.
(1) 14 in. 6 ft. Prentice, taper attach-
(1) 14 in. x 6 ft. Flather comp. rest
(1) 14 ft. x 6 ft. Hendey, taper attachment
(1) 14 in. x 6 ft. Flather, taper attachmen
(1) 14 in. x 6 ft. Whitcomb Blaisdell turret on shears
(2) 14 in. x 6 ft. Le Blond
(1) 14 in. x 8 ft. Flather
(2) 15 in. x 6 ft. Blaisdell
(1) 16 in. x 6 ft. Reed
(2) 16 in. x 6 ft. Lodge & Shipley
(2) 16 in. x 6 ft. Pratt & Whitney
(1) 20 in. x 8 ft. Flather
(1) 22 in. x 12 ft. Walcott, comp. rest
(1) 24 in. x 8 ft. Flather
(1) 24 in. x 10 ft. Lodge & Barker
(1) 26 in. x 12 ft. Reed—chuck fitted
(1) 32 in. x 20 ft. Jackson & Wiley
(1) 62 in. x 20 ft. Cummer
(1) 62 in. x 25 ft. Putnam, motor driven

LATHES—POLISHING

(2) No. 3 Diamond, 52 x 1 1-4 spindle
(2) No. 7G Diamond, 48 x 1 1 4 spindle

MILLING MACHINES

(1) No. 2 Pratt & Whitney—hand
(1) No. 3 Garvin—hand
(1) No. 1 Pratt & Whitney—plain
(1) No. 1 Brainard Universal
(1) No. 15 Becker-Brainard Univ.
(1) No. 2 Brown & Sharpe universal
(1) No. 3 Brown & Sharpe universal
(6) No. 2 Pratt & Whitney Lincoln pattern
(1) No. 40 Becker-Brainard double head
(1) 42 in. x 24 in. x 8 ft. Ingersoll, slab

PLANERS

(1) 20 in. x 20 in. x 4 ft. Wheeler, 1 head
(1) 24 in. x 24 in. x 6 ft. Cincinnati 1 head
(1) 26 in. x 26 in. x 10 ft. Powell, 2 heads
(1) 36 in. x 36 in. x 10 ft. Gray, 1 head, arranged for 2.
(1) 42 in. x 36 in. x 14 ft. Cincinnati, 2 heads
(1) 42 in. x 42 in. x 21 ft. Woodward & Powell, 4 heads

PRESSES

(1) D75 Ferracute
(1) No. 62 Toledo
(1) No. 8 Greenerd arbor

SAWS

(1) 6 in. Cochrane-Bly
(1) 6 in. Newton

SHAPERS

(1) 15 in. Pratt & Whitney tool room
(1) 16 in. Stockbridge, back geared
(1) 20 in. Hendey
(1) 24 in. Gould & Eberhardt
(1) 24 in. Hendey
(1) 24 in. Potter & Johnson
(1) 28 in. Hendey

TURRET LATHES

(2) No. 2 Pratt & Whitney wire feed
(2) No. 3 Pratt & Whitney wire feed
(1) No. 4 Hardons & Oliver
(1) No. 5 Warner & Swasey
(2) 2 in. x 24 in. Jones & Lamson
(1) 2 in. x 26 in. Pratt & Whitney
(1) 21 in. Gisholt with taper att.
(1) 22 in. Bullard "H" machine
(2) 22 in. Lodge & Shipley

THE MOTCH & MERRYWEATHER MACHINERY CO.
707-715 Lakeside Ave. N. W., Cleveland, Ohio
Detroit Br'ch: 1025 Majestic Bldg. Cincinnati Br'ch: 1014 1st N't'l B'k Bldg

GENERATORS DIRECT CONNECTED TO ENGINES

150 K. W., 125 V., D. C., Westinghouse direct connected to 14½" & 25" x 18" Buckeye L. H., Style C. tandem comp. auto. engine.
2 75 K. W., 125 V., 1500 Lt., D. C., Westinghouse, direct connected to 12" & 20" x 12" Westinghouse comp. auto. engine.
50 K. W., 250 V., 1000 Lt., D. C., Thompson-Ryan direct connected to 12" x 12" McEwen center crank auto. engine.
50 K. W., 110 V., 1000 Lt., Gen. Elec., direct connected to 10" & 14" x 14" Russell tandem comp. auto. engine.
50 K. W., 125 V., 1000 Lt., Commercial direct connected to 11" x 14" Buckeye, Style C., auto. engine.
30 K. W., 110 V., Fisher marine generator set, direct connected to 9½" x 14" x 8" vertical cross comp. auto. engine.
27 K. W., 115 Volt, Commercial D. C. Direct Connected to Sturtevant Vertical Automatic Engine.

BELTED GENERATORS—DIRECT CURRENT

110 K. W., 250 V., 2200 Lt., Crocker-Wheeler, 720 R. P. M.
100 K. W., 250 V., 2000 Lt., Milwaukee, 600 R. P. M.
40 K. W., 1100 V., single phase, 60 cycle, Westinghouse, 1650 R. P. M.
2 30 K. W., 125 V., 600 Lt., Akron bipolar, 655 R. P. M.
30 K. W., 4 pole, 124 V., 600 Lt., Hobart, 640 R. P. M.
25 K. W., 125 V., 500 Lt., Gen. Elec., 1100 R. P. M.
15 K W, 125 V., 200 Lt., Akron bipolar, 1700 R. P. M.
25 K. W., 125 V., 500 Lt., Triumph, four pole, 950 R. P. M.

WICKES BROTHERS,
117-119 Fourth Ave., - PITTSBURG, PA.

Frogs & Switches

ALSO

LIGHT RAILS, SPLICE BARS, SPIKES & BOLTS, SWITCHSTANDS, RAIL BRACES,

Quick Shipments of Short Orders.

CAR PUSHERS, DERAILERS, HEAVY CHAIN, PLATES 12' to 36' CUT TO SKETCH.

CENTRAL TRACK SUPPLY COMPANY, Springfield, O.

COMPLETE LIST CAN BE HAD FOR THE ASKING

LATHES

84 in. x 40 ft. Putnam
36 in. x 12 ft. Putnam, rod feed
22 in. x 58 in. x 16 ft. rod fd. Gap Lathe
30 in. x 14 ft. Fifield. 24 in. x 14 ft. Betts
24 in. x 9 ft. Pond, rod feed
20 in. x 14 ft. Betts 20 in. x 8 ft. Betts
20 in. x 8 ft. Pond, rod feed
19 in. x 6 ft. Pond
18 in. x 8 ft. Wood & Light
Complete stock of 16 in. x 8 ft., 14 in. x 6 ft. and 12 in. Lathes on hand

PLANERS

84 in. x 84 in. x 27 ft. Lowell, 2 heads
84 in. x 84 in. x 24 ft. Putnam, 1 head
37 in. x 33 in. x 10 ft. Bement
36 in. x 36 in. x 18 ft. Niles, 4 heads
36 in. x 36 in. x 17 ft. Sellers
30 in. x 30 in. x 12 ft. Bement, 2 heads
24 in. x 24 in. x 6 ft. Lathe & Morse
Several 15 in., 16 in. and 18 in. Planers on hand

SHAPERS

20 in. x 20 in. Fedrick & Ayer, open side
18 in. Hendey, 18 in. Ohio
18 in. Ohio, new, 16 in. Ohio, new
16 in. Pratt & Whitney
13 in. x 24 in. English, traveling head
9 in. x 26 in. Sellers. 16 in. Juengst
Sever'l small Shapers carried in stock

HAMMERS

2500 lb. Morgan, Double Frame
1000 lb. Chambersburg Steam Drop
800 lb. Pratt & Whitney Board Drop
400 lb. Merrill
250 lb. Morgan, Steam
50 lb. Morgan, Steam
No. 2 Hawkeye Trip No. 0 Dupont
Williams & White No. 4 Riveter

SLOTTERS

12 in. New Haven
10 in. Lowell 6 in. Hewes & Phillips

MISCELLANEOUS

No. 5 Cincinnati Double End Punch and Shears, 8 in. Throat
10 in. x 30 in. Iroquois full Uni. Grinder
No. 11 Higley Cold Saw
8 22 Ferracute Forging Press
4½ in. x 48 in. Burr Shaft Keyseater with Routing Attachment
52 in. Bement Boring Mill
48 in. Hor. Boring Mill
60 in. Harrington Pulley Borer
Two 30 in. Bullard Vertical Turret head Boring Mills
Full stock of Presses, both new and second-hand. No. 4 Hibbard P'ch Press

FRANK TOOMEY, 127-131 N. Third St., Philadelphia, Pa.

FOR SALE

1—48" x 21' Putnam Triple Geared Engine Lathe, Used six months.
1—12" Niles Late Improved Slotter, used three months.
1—42" x 42" x 8' Detrick & Harvey Open Side Planer. Used three months.
1—14" x 14" Hall Duplex Belt Driven Compressor, 650 cu. ft. Good condition.
1—10 x 10 x 10 Laidlaw-Dunn-Gordon Compressor. Used six months.
1—40" Betts Vertical Boring Mill. Fine condition.

WM. WARD MACHINERY CO., 801 House Building Pittsburg, Pa.

WANTED

9 in. or 10 in. Finishing Mill,

Second hand and in good condition. Address

FINISHING MILL
410 Park Bldg., Pittsburgh, Pa.

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The Penton Publishing Co.
Cleveland.

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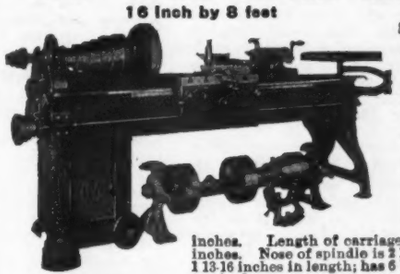
16 inch by 8 feet



DIMENSIONS

Swings over shears 16 1-4 inches. Swings over carriage 10 1-4 inches. Takes between centers 4 feet 10 1-2 inches. Diameter of hole through spindle 1 5-16 inches. Size of front bearing of spindle 2 9-16 inches diameter by 4 1-2 inches long. Size of rear bearing of spindle 2 3-16 inches diameter by 3 inches long. Traverse of compound rest 4 3-4 inches. Length of carriage bearing on shears 23 inches. Nose of spindle is 2 1-4 inches in diameter, 1 13-16 inches in length; has 6 U. S. Standard threads per inch.

Lathe complete with Large and Small Face Plates, Compound Rest, Steady Rest, Power Cross Feed Change Gears. Splined Screw with interlocking device for belt or gear drive. Wrenches, Large Cabinet Leg and Friction Countershaft. Weight 1,750 lbs.

Manufactured by

The G. M. Lathe Company, Lennox Bldg. CLEVELAND, O.

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REPRESENTATIVES WANTED TO HANdle small steel castings in the following cities: Toledo, Detroit, Erie, Buffalo, Youngstown, Columbus and Cincinnati. Address West Steel & Iron Casting Co., Cleveland, O.

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ABOUT TO TERMINATE A FIVE-YEAR contract—a foundryman looks up to see who's next. An advance here if I stay and an outside offer or two, but tonnage and variety and progress in methods is my aim. Since 1883 with blast furnaces, cupolas and laboratories. Original applications of chemistry and metallography. Yet young at 47. Investigate my patents and processes. Mine and city wheels beat all records. High priced mixtures eliminated years ago by study and practice. Address Box 51, care PENTON'S LIST, Cleveland, O. p.

POSITION WANTED. ENGINEER OF established reputation, wide experience apprentice to works manager, intimate knowledge of best shop and machine tool practice on heavy work, gilt-edged record, is open for engagement as works manager with full responsibility and can deliver the goods. Address Box 399, THE IRON TRADE REVIEW, Cleveland, O.

SALESMAN, PRACTICAL MAN OF 30, having held the following positions within the past 12 years, with large concerns in the steel, malleable and gray foundry business, is open for an engagement as sales manager, purchasing agent, cost clerk, paymaster, foundry order clerk and salesman, having traveled the past five years from Maine to Kansas City. Address Box 52, PENTON'S LIST, Cleveland, Ohio. p.

POSITION WANTED AS COST ACcountaint. Young man, 32, married, 10 years office and machine shop experience, thorough accountant and practical machinist, desires position as cost and factory accountant. At present employed as such, but for good reasons wishes to change. No "expert," but a well qualified specialist, seeking a permanent position at a reasonable salary with a responsible machinery manufacturing concern. Address Box 395, THE IRON TRADE REVIEW, Cleveland, O.

WANTED TO SELL STAPLE OR SPEcial lines to iron, steel and metal consuming trades in Cincinnati territory by local representative of wide acquaintance and long experience in southern Ohio, Indiana and Kentucky. Address "Ferroman," care THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED. FOREMAN BOILermaker thoroughly experienced on all kinds of boilers, tanks, blast furnaces and general plate work; good estimator and layer-out and understands designing flange blocks for hydraulic presses and can get work out at lowest costs. Address Box 400, THE IRON TRADE REVIEW, Cleveland, O.

PRACTICAL COST MAN WANTS TO LOcate with manufacturer who wants accurate cost data with minimum help. Can install complete system. Will adjust overhead expense in modern manner; can get results immediately; gives data to manager that will greatly aid production, or corral leaks; system to suit your factory. Address Box 396, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED. CHEMIST, UNIversity graduate in chemical engineering course with six years' experience in charge of testing laboratories wants position as chemist or assistant superintendent of blast furnace or smelting works, or steel works. Best of references as to ability and character. Address Box 382, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED AS FOUNDRY foreman; 20 years' experience, 3 as foreman; can handle light or heavy work; understand the mixture of iron and brass; can furnish references. Box 50, PENTON'S LIST, Cleveland, O. p

SITUATION WANTED BY THOROUGHly experienced accountant possessing executive ability as accountant, auditor, or office manager, with a thoroughly practical knowledge of factory cost accounting. Now closing eight years' service as accountant and office manager for structural steel company; 15 years' experience, age 34, best of references. Address Box 390, THE IRON TRADE REVIEW, Cleveland, O.

FIRST-CLASS BRASS FOUNDRY FOREman open for engagement; 20 years' experience, last six as foundry foreman; ambitious, energetic, good capable man in handling help, thoroughly familiar with five makes of molding machines. Can give the best of references as to ability and character. Can turn out castings in most economical way. Address "Modern," care PENTON'S LIST, Cleveland, O. p.

A THOROUGHLY EXPERIENCED BRASS foundry foreman would like to correspond with responsible party desirous of starting a brass foundry business. I have the experience and would work for an interest. Address Box 120, Lincoln Park, N. Y. p.

BUSINESS OPPORTUNITIES

EXPERIENCED FOUNDRYMEN WISH to establish a brass foundry in growing town where such is needed. Any person or Board of Trade knowing good location please address Box 398, THE IRON TRADE REVIEW, Cleveland, Ohio.

CAPITAL OR A GOING BUSINESS wanted to exploit patented improvements on closed hub, self-oiling, mining wheel of most noted record; the joint owners, a mechanical draftsman and an experienced foundryman, with chemical methods, wish to be identified with the manufacture and their interest to be stock and royalty. Address J. H. R., 2008 Forest avenue, Knoxville, Tenn. p.

STRICTLY MODERN GRAY IRON FOUNdry for sale, completely equipped and in daily operation on profitable machinery work. Located in Michigan town with excellent shipping facilities. Best of reasons for selling and will make liberal terms. Full information cheerfully furnished. Address Box 338, THE IRON TRADE REVIEW, Cleveland, O.

FOR SALE, MACHINE AND MOLDING shops, together with patent coal mine car wheel, wheel fully demonstrated; shops running full time and the only coal mine car wheel factory in Kentucky. I am prepared to give for cash the best trade you ever made. Signature explains reason for selling. Address J. S. Smith, M. D., McHenry, Ky. p.

FOR SALE, FOUNDRY COMPLETE, ALL on the ground ready to set up; everything good and to be in connection with a good new machine shop at Lewiston, Idaho. Write or call on M. D. Taylor for full particulars, owner of machine shop at Lewiston, Idaho. p.

WANTED PARTY WITH A FEW THOUsand dollars to join me in exploring iron property on Mesabi iron range. R. B. Higbee, Germania Life Bldg., St. Paul, Minn.

ENGINE FOR SALE.

FOR SALE—ONE 23 X 60 SINGLE CYLinder, double acting, Harris Corliss, pendulum ball governor, with section cast iron fly wheel, 18 ft. x 38". Good order, requirements changed, electric power being used. Address Almond Mfg. Co., Ashburnham, Mass. p.

ONE HAMILTON CORLISS ENGINE for sale, 125 H. P., good condition. Address Western Iron & Foundry Co., Wichita, Kansas.

UNUSUAL BARGAINS IN GAS ENgines. Ten 2 to 3 H. P. Standard make. Absolutely new engines fully guaranteed—special reason for selling. Address Box 55, PENTON'S LIST, Cleveland, O. p.

FURNACE FOR SALE.

ONE NO. 2 SCHWARTZ OIL FURNACE for sale, complete with pipe connections, smoke stack, ventilating hood and two extra sets of new linings. Can be bought at a decided bargain if taken at once. Louisiana Contracting Co., St. Louis, Mo.

WASHERS "SPECIAL SIZES."

In any quantity, metal or fibre. Dies, Stamping and Screw Machine Work. Quadriga Mfg. Co., 18 So. Canal St., Chicago, Ill. p.

FOR SALE—MISCELLANEOUS.

PATENT FOR SALE (RECENT ISSUE) pertaining to machine shop equipment, just coming into general use. Good seller, good profits; reason for selling, have other patent better adapted to our equipment and selling to different class of trade. Patterns and jigs go with patent. Address Titus Machine Works, Marion, O. p.

FOR SALE, 90 H. P. ATLAS BOILER; 60 inches diameter; 60 tubes, 3¼ inches; length, 14 ft.; shell 5/16 thick; dome 30 x 30, with cast fronts and grate. Good for 75 lbs. pressure. First-class condition. $250.00. Also 200 H. P. Frick upright engine, 18 x 18 cylinder, 180 R. P. M., no flywheel. The Kansas City Bolt & Nut Co., Kansas City, Mo. p.

A POSTAL CARD WILL BRING YOU our list of second-hand and rebuilt woodworking machinery, engines, boilers, etc. All rebuilding and overhauling done in our own shops, guaranteed as represented at prices especially attractive to close buyers. Your inquiries will be appreciated and receive prompt attention. Currier-Koeth Mfg. Co., Coudersport, Pa. p.

FOR SALE. THREE TWO-SPINDLE 1-inch Landis bolt cutters, complete with countershafts, dies, pumps, etc. All in first-class condition. Price low. Graham Nut Co., Pittsburg, Pa.

"TEDDY," THE FAMOUS SCREW FEED flue expander and flue cutter, is the best on earth. Highly recommended and pleasing to all who have tried same. Manufactured by the Fernyak Machine Co., Mansfield, O. Write for full particulars and prices. p.

FOR SALE CHEAP. LATHE-BED PIPE machine, brand new. The Loew Mfg. Co., Cleveland, O.

FOR SALE.—A. B. C. EXHAUST FAN, 35", new, never used. The Bashlin Company, Warren, Pa. p

FOUNDRY BARRELS FOR SALE—BATtery of four 36" x 48" Whiting spur geared tumbling barrels, in stock, never used, ready for immediate shipment. Also cupolas, ladles, elevators and other foundry equipment. We can supply your wants in hand power or electric cranes, also foundry blowers and other equipment. Sam'l. W. Hay's Sons, 301 Farmers Bank Bldg., Pittsburg, Pa. p.

SCRAP WANTED.

TAKE NOTICE. WE ARE BUYERS OF all grades of scrap metals, such as scrap copper, brass, lead, babbitt metals, factory metal skimmings, drosses, metal clippings, spelter, etc. Advise quality and quantity you have on hand to offer and we will name best prices f. o. b. your city. H. Kander & Co., Bowling Green, Ohio.

CHEMISTS, ASSAYERS, SAMPLERS OF ORES, ETC.

ORES SAMPLED, TESTED, AND ASsayed. Analysis of ores, fuels, limestone, iron and steel, clay and cements. Ethelbert Ely, Dover Laboratory, Dover, N. J. Established 1868.

LET US HAVE YOUR SPECIFICATIONS
ON SINGLE DUPLEX & ROTATIVE
STEAM AND POWER

PUMPS

THE JOHN H. McGOWAN CO. CINCINNATI

SIMPLE COMPOUND & COMPOUND CONDENSING
ELEVATOR & WATER WORKS
PUMPING ENGINES

RAILS

40, 56, 60, 70, 75, 80, 85 and 90 lb.

RELAYING RAILS

8, 12, 16, 20, 25, 30, 35, 40 and 45 lb.

NEW STEEL RAILS

These rails are in stock at our Pittsburg yards and can be shipped immediately; also second-hand rails in stock cut any length needed for building and contract work.

RICHARDSON & COMPANY, Inc.,
12th Floor Fulton Bldg.
PITTSBURG, PA.
RAIL DEALERS

FOR SALE

Bankrupt Factory, Plant, Machinery, Tools, Stock, Material and Finished Product of the Shelbyville Machinery Company. Excellent Building, Machine Shop, and Foundry, Located on two Railroads, with best of facilities for Skilled Labor and Market. Appraised at low figure at $31,782. All Machinery and Equipment Modern and in Best of Condition. Cause of Failure, lack of capital. Sale by Sealed Bids February 1, 1909. Plant may be examined at any time at Shelbyville, Ill. Full particulars of

WALTER C. LINDLEY, Trustee
Danville, Ill.

Factory Window Sash For Sale

60—12-Light Sash, 12 x 14″ glass.
288— 9-Light Sash, 12 x 14″ glass.
18— 6-Light Sash, 12 x 14″ glass.
56— 9-Light Sash, 12 x 12″ glass.

Good quality White Pine and glass. These sash are new—never used. Also have new Hemlock Window Frames and Door Frames. Write for list.

H. M. Loud's Sons Co.
Dept. K,
AUSABLE, MICHIGAN

p.

BARGAINS

Alternating and direct current motors, dynamos; also plating dynamos at bargain prices.
All makes and sizes, sold, bought and repaired.

EUGENE L. RICHTER ELECTRIC CO.
N. E. Cor. Uber and Columbia Ave.
Dept. C. Philadelphia, Pa. p

Boilers, Engines, Etc.

For Sale at Wrecking Prices!

We have in stock ready for immediate delivery the following items, on which we are prepared to quote extraordinary low prices.

ENGINES

1—28x60 L. H. Hamilton Corliss Engine.
1—24x48 L. H. Atlas Corliss.
1—18x42 L. H. Hamilton Corliss.
1—14x42 L. H. Atlas Corliss.
1—12x30 L. H. Atlas Corliss.
1—15½x16 R. H. Automatic Buckeye Engine.
1—13x12 Center Crank Automatic New York Safety Engine.

PUMPS

1—16x14x10 Worthington Duplex Steam Pump.
1—14x7x10 Worthington Duplex Steam Pump.
1 No. 15 Morris Centrifugal Sand and Drainage Pump direct connected to vertical 12x10 Engine.
1 No. 15 Belted Morris Centrifugal Pump.
1—200 M. P. Cookston Water Heater.

BOILERS

2—18x14 Butt Strapped Double Riveted Horizontal Boilers.
10—72 x 20 Horizontal Tubular Boilers, quadruple riveted, 110 lbs. pressure.
6 Horizontal Tubular Boilers, 72x20, Quadruple Riveted, good for 110 lbs. steam pressure.
1—125 H. P. Internally Fired Boiler, with Morrison Corrugated Furnace.
1—13 and 20 x 14 Tandem Ideal Compound Engine direct connected to 100 K. W. General Electric, 125 volt Direct Current Generator thoroughly overhauled; practically new.

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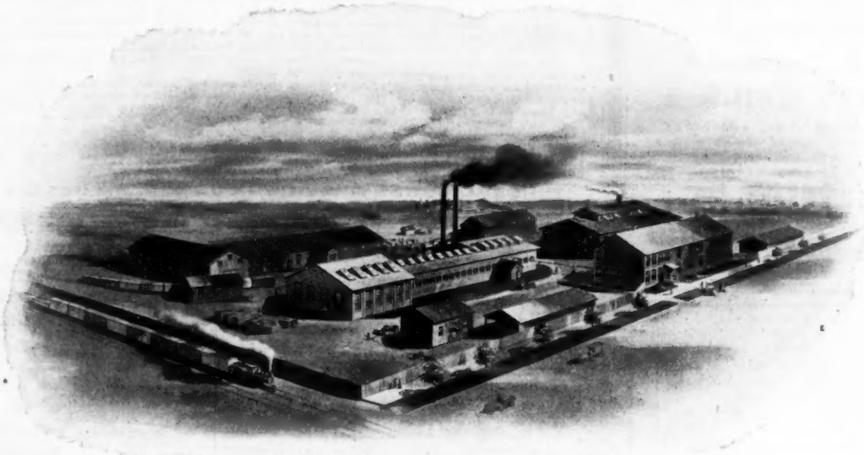

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